TEXTILE READER'S GUIDE

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Subscriptions are available to Non-members of the Institute. The rate is $25.00 per year.

Advertising rates are available upon request.

Abstracts

FIBERS A

Natural fibers A 1

Density of cellulosic fibers

P. H. Hermans. *L'Ind. Textile 69,* 19-25, 79-81 (1952); *in French.*

The volume of cellulosic fibers is the sum of the volume of the cellulose substance, water, and empty spaces. It is explained why low, medium, and high densities are obtained when organic liquids , He, H_2O, respectively, are used as buoyancy agents. The densities of viscose and cotton fibers when swollen show slight maxima at 2 to 3 and 3 to 4% regain, respectively. They then rapidly decrease with increasing H_2O content. The partial density of the cellulose substance in water-swollen fibers is 1.604 for model filaments and 1.590 for cotton. Calculated densities of most fibers are lower than exptl. densities up to 22% regain for viscose and up to 100% regain for cotton. This is due to the empty spaces present in the fiber which are responsible for the increase in apparent density of the absorbed water.

Properties of thermo-plastic fiber-bonded fabrics

Arthur C. Wrotnowski. *Textile Res. J. 22,* 480-86 (1952).

Test procedures and physical properties are given for cotton, nylon garnett, asbestos, and glass fiber thermo-plastic fiber-bonded fabrics. A range of thicknesses for each blend and weight is used to demonstrate a wide variety of fibrous constructions. The tensile strength, air permeability, and water absorption characteristics of four fiber-bonded fabrics are discussed. It is indicated that any textile fiber can be fabricated by this process.

The great adventure of fiber structure

Anon. *Textile Recorder,* 93 (June 1952).

That the most important and most persistently exciting theme running through the science and technology of fibers was that of molecular chain folding and the interpretation of elastic properties, was stressed by Professor W. T. Astbury. He explained briefly how the adventure of fiber structure was made possible through a

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cooperative effort of biology, technology, physics, chemistry and medicine.

Artificial Fibers A 2

Dynamic stress-strain properties of viscose rayon

W. Wegener. *Deut. Textilgewerbe 54*, 105-12 (1952).

Rayon was tested on the basis of dynamical endurance loading with the loading decreasing proportionally to the elongation. Based on the experimental results, a method for the analysis and evaluation of rayon was established.

Fiber friction

Ettore Viviani and L. Graziano. *Rayonne et fibres Synthet. 8*, No. 1, 277-33 (1952).

The friction was investigated between a rayon filament and a steel or glass cylinder. Defects of a rayon ribbon are found to be the result of the variation of fiber friction which causes tension and semipermanent set in the warp yarns.

Properties of wool-nylon blends

Anon. *Textile Recorder*, 86 (June 1952).

There was a substantial linear relationship between yarn or fabric breaking load and the percentage of nylon in the blend. There was little to choose between the all-wool fabric, the fabric containing 75 per cent wool—25 per cent nylon staple, and that containing equal proportions of wool and nylon staple, as far as handling characteristics are concerned. The general trend was for the abrasion resistance to increase linearly with increasing content of nylon staple.

What can vinyl fibers impart to rayon and spun rayon?

J. M. Alibert. *Rayonne et Fibres synthet. 8*, No. 1, 45-8 (1952) ; *in French.*

Certain fabric patterns not otherwise obtainable can be produced by blending vinyl multi-filaments or staple fibers with viscose or acetate if the fabric is heated. This is due to the shrinkage of the vinyl component.

YARN PRODUCTION B

Fiber preparation B 1

ASME textile division told of two new wool blending systems

Harmon B. Riehl. *Textile Industries 116*, 114-116 (August 1952).

See front section.

Lubricating and conditioning agents for acetate rayon

Celanese Corp.; Brit. *Rayon and Silk J. 29*, 68 (July 1952), B. P. 672286 (May 21, 1952).

A composition that can be applied to acetate rayon (continuous filaments and staple) in one operation and which is also anti-static comprises a partial ester of phosphoric acid with a long chain aliphatic acid with loss of water, and alkylolamine and an alkyl phenol all blended into a mineral lubricating oil.

New fiber conditioning machine

U. S. P. 2,589,797, March 18, 1952.

See front section.

Staple fiber blend

George C. Ward (Celanese Corp). U. S. P. 2,607, 980 (August 19, 1952).

A staple fiber mixture to be used in producing spun yarn comprises lengths of unmodified cellulose ester fibers and lengths of partially saponified cellulose ester fibers whereby varied effects are achieved by selective dyeing.

Stock vat exhaust process for machine dyeing

M. Brauer. *Melliand Textilber. 33*, 623-26 1952) ; *in German.*

According to this process, predyeing is performed with a hydrolyzed vat in slightly alkaline medium. Only after exhaustion of this impregnating bath, dyeing is completed by adding the normal quantities of caustic soda and hydrosylphite. This process dispenses with graded additions of electrolyte, caustic soda and hydrosulphite.

Carding and Combing B 2

A new brush for card flats

Anon. *Textile Recorder, 106* (June 1952).

An undercard flat clearer brush has recently been introduced by an English company. The new development is a circular brush which passes the full length of the card flats and is comprised of six rows of brushes, built up on a circular body, with each row fitting into the hollows inside the flats. The brush rotates slowly with the travel of the flats and the material of which it is made is such that it will collect dirt and fly which lodges inside the flats, and at the same time, keeps the flat ends clean.

Card sliver variation can be reduced

Henry Paul. *Textile Industries 116*, 96-98

(August, 1952).

See front section.

Comber

John S. Dudley (to Whitin Machine Works), U. S. P. 2,593,017, April 15, 1952.

In a comber including a comb cylinder and a reciprocating nipper frame and a cushion plate carried thereby, the combination of a front support for the frame comprising a pivoted member movable about a center located on one side of the reciprocating path of movement of the cushion plate of the nipper frame, and a rear support for the frame comprising a pivoted member movable about a fixed center located on the opposite side of the path.

How to increase capacity of present card-sliver cans

Anon. *Textile World,* page 113 (August 1952).

See front section.

Major problems in woolen carding

P. P. Townsend. *Textile Recorder,* 91-3 (June 1952).

In this critical analysis of a process which has remained basically unchanged for two hundred years, the author discusses certain fundamental questions including that of involving an entirely new and more satisfactory method of doing the work. The main topics of his discussion are (1) no change in basic principles, (2) can the card be displaced, (3) factors in successful carding, (4) assessing a carded web, (5) Garnett versus card wire, (6) what type of tooth, (7) the problem of fettling frequency, (8) rates of production, and (9) fancy and doffer efficiencies.

Drafting and roving B 3

Mounting for drawing rolls

Charles R. McGhee (to Southern Spindle & Flyer Co., Inc.), U. S. P. 2,592,718, April 15, 1952.

In a roving frame, spinning frame and the like having roll stands and also hoving bottom rolls therein connected together by roller necks, an improved mounting for supporting each of the roller necks connecting the bottom rolls comprising an anti-friction bearing mounted in the roll stands adjacent each of the roller necks and being of substantially less axial length than the axial length of the roller neck and surrounding the roller neck, annular lubricant seals positioned

about the roller necks at opposed ends of the anti-friction bearing, means for introducing a lubricant to the adjacent rolls being slightly greater than the diameters of the anti-friction bearing, the diameter of the adjacent rolls being slightly greater than the diameters of the anti-friction bearing and the lubricant seals, the end of one of the adjacent rolls serving to hold one of the lubricant seals in position, a washer positioned about the roller neck and adapted to hold the other of the lubricant seals in position, whereby the roller necks may rotate freely in the anti-friction bearings and the lubricant seals will prevent lubricant from leaking onto the adjacent rolls.

Spinning B 4

Bearing structure for spinning and twisting spindles

Werner Naegeli (to Actiengesellschaft Joh. Jacob Rieter & Cie), U. S. P. 2,593,334, April 15, 1952.

A bearing for spinning and twisting spindles, comprising a spindle holder forming a housing at its upper end, the housing having an outer cylindrical wall extending coaxially with the spindle axis, and an inner coaxial cylindrical wall of shorter height than the outer wall, said two walls forming an annular chamber between them, a spindle sleeve in the holder and provided with a central bore into which the spindle extends in operation, the lower portion of the bore being of a size that only a small amount of play is present between the spindle and the lower portion of the sleeve, a collar formed on the upper end of the spindle sleeve, the collar being lodged within the housing and supported on the upper edge of the inner cylindrical wall of the housing, and a multiple fluid flow damping means interposed between the collar and the outer cylindrical wall of the housing and supported on the bottom of the annular chamber between the inner and outer wall of the housing.

Monitoring device to detect yarn slubs

Wilmer C. Anderson (Deering Milliken Res. Trust), U. S. P. 2,605,535 (August 5, 1952).

Apparatus for removal of oversized sections of yarn wherein air is delivered through an orifice over which the yarn travels. If the yarn diameter exceeds a predetermined value, the pressure increase in the chamber triggers a member which breaks the yarn.

Multiple spindle spinning machine of the worm and worm wheel drive type

Louis Birkigt (to Society "Hispano-Suiza"), U. S. P. 2,92,853, April 15, 1952.

A multiple spindle spinning machine which comprises, in combination, a plurality of spinning spindles mounted on this support, a worm carried by each of the spindles, a support, a shaft extending in the support, a plurality of worm wheels carried by the shaft in mesh with the worms, a support, the shaft being made of a plurality of sections disposed end to end, a device for coupling the end of each shaft section with the adjacent end of the next shaft section, this coupling device including a coupling member in line with the shaft sections, two tenon and mortise cooperating means for assembling the adjoining ends of the member and each of the shaft sections, two sleeves slidable along the shaft sections each arranged to cover one of the tenon and mortise means, and means for detachably securing the sleeves on the shaft sections, respectively, and a worm wheel carried by each of the sleeves, each of the last mentioned worm wheels being one of the above mentioned plurality of worm wheels.

Yarn balloon separating rings for ring spindles

F. Oertel. *Melliand Textilber. 33,* 598-601 (1952); *in German.*

In connection with a recent American patent relating to anti-ballooning rings with a smaller diameter than the spinning ring, and their effects upon the thread tension, the author describes previous tests which he has carried out with an experimental arrangement of this kind, and which are of value in ascertaining the validity of the American patent claims.

Winding and Spooling B 5

Winding machine

Winthrop L. Perry (to Abbott Worsted Mills, Incorporated), U. S. P. 2,592,599, April 15, 1952.

A winding machine including a plurality of winding units, the machine being constructed for travel of the units in a path comprising opposite straight portions connected by curved end portions, each winding unit being constructed to unwind thread from magazined supply packages and including a rotatable double package carrier for holding two packages, one in an outer and the other in an inner location on the winding unit, and a device arranged at a curved end portion of the path to there rotate a package carrier of a passing unit, to reverse the position of the package carrier.

Yarn Application B 9

Bonding of cellulose fibers to rubber

B. P. 670,436, Courtaulds. *J. Soc. of Dyers and Col. 68,* 283 (1952).

Better bonding is obtained between cellulose and rubber if the cellulose has been treated so as to contain side-chains containing unsaturated carbon-carbon groups before the assembly is vulcanized. Thus the cellulose fibers may be impregnated with allyloxymethylpyridinium chloride and then baked during vulcanization.

Constant tension device

Donald E. Howe (*The Firestone Tire and Rubber Co.*), U. S. P. 2,605,061, July 29, 1952.

A constant tension device for a travelling yarn comprising an upper rotating vane assembly immersed in a liquid and a stationary lower vane assembly positioned on the bottom of the liquid container. The upper assembly is raised or lowered in response to the yarn tension to effect a fluid drag between the vane assemblies.

Elastic thread

Robert R. Dreisbach (The Dow Chemical Co.), U. S. P. 2,605,508 (August 5, 1952).

Methods of producing elastic thread which comprises working at an elevated temperature and dry-extruding a composition of a rubber-like copolymer of a lower aliphatic conjugated diolefin, and alpha-methylene lower alkyl cyanide, and a lower alkyl alpha-methylene-lower alkyl ketone.

Treating cotton cord

Matthew W. Wilson and Ed. T. Lessing (B. F. Goodrich Co.), U. S. P. 2,606,844 (August 12, 1952).

A method of manufacturing cotton cord for reinforcing rubber material comprises treating the cord with an aqueous solution of sosin amine acetate and drying the cord under tension at 300° F.

FABRIC PRODUCTION C

Yarn Preparation C 1

Ensuring the correct sequence in a warped thread layer

Svend S. C. Fleischer, U. S. P. 2,603,852 (June 22, 1952).

Threads are maintained in correct sequence in a warped thread layer used for heddling a loom

by arranging the threads in correct sequence and running a row of looped stitches of thread transversely across the arranged warp to enclose the individual threads in the loops of the stitches.

Factors influencing yarn tension in warping

R. F. Dyer, W. G. Faw and H. L. Beard. *Textile Res. J. 22,* 487-98 (July 1952).

The variables of yarn twist, balooning of the yarn during withdrawal, yarn speed, and cone size are discussed as factors which control withdrawal tension in warping. The magnitude and frequency of tension variations caused by these factors are shown by graphic records obtained by suitable recording instruments. The three basic methods for applying tension to the yarn have been classified as multiplying, additive, and compensating. The limitations and advantage of tension devices incorporating these basic methods in pure and combined forms are discussed with reference to the basic equations and graphic records.

Weaving C 2

A new reed grinding and polishing machine

Anon. *Textile Recorder,* 110 (June 1952).

The new machine is compact, strong and requires for its operation a space only a little wider than the maximum length of reed to be cleaned. The machine will take all standard lengths and widths of reed and is entirely self contained, requiring only to be connected to the power supply. The machine can also clean a reed without grinding it.

Electric weft detecting system for shifting shuttle box looms

Robert A. Donnan (to Crompton & Knowles Loom Works), U. S. P. 2,592,126, April 8, 1952.

In an electric weft detecting system for a loom having a lay provided with a gang of four shuttle boxes which move relatively to the lay during a box shifting interval, mechanism controlling the movements of the gang during the interval including two levers which by their movements determine which shuttle box of the gang shall be inactive position at the end of a shifting interval, an electric weft detector having two electrodes for each shuttle box performing a detecting operation during a detecting period occurring during a box shifting interval, electric circuit means effective when closed to cause loom stoppage in-

cluding one of the electrodes of each detector, the one electrode being connected to the circuit means in parallel, selector electric switch means, and yielding connections operatively relating the selector switch means to the levers by which the latter move the switch means during the first part only of the movements of the levers to electrically connect the other electrode of the detector corresponding to the shuttle box to be in active position at the end of a box shifting interval to the circuit means prior to the detecting period occurring in the interval, the detector corresponding to the shuttle box to be in active position, if indicating weft exhaustion, closing the circuit means during the detecting period.

Loom cloth edge determining device

Gottfried Schneebeli, Zurich (to Robert Schwarzenbach & Co.), U. S. P. 2,591,725, April 8, 1952.

A cloth edge position determining device for a loom, comprising mounting means for attaching the device to a loom, a carrier frame pivotally fastened to the mounting means, an indicating dial guage having a rectilinearly projectable pointer operating feeler mounted on the frame, gauge and feeler being unitarily swingable about the pivot, so that the feeler is movable into and out of engagement with the cloth edge or the like, whereby the cloth can be predeterminedly located relative to the loom, and a settable index carrying member on the indicating dial guage cooperable with the pointer.

Studies in textile design

Anon. *Textile Recorder,* 94-6 (June 1952).

This article is devoted to crepe designs. It describes (1) use of crepe yarn, (2) a classical georgette fabric, (3) a fancy georgette, and (4) a diagonal style.

Special Fabrics C 4

Cellulosic textile fabric

Arthur Johnson and John Bamber Speakman (to Alginate Industries Limited), U. S P. 2,592,154, April 8, 1952.

A process of making woven fabrics which comprises winding alkali soluble alginate yarn having a fineness of betwen 50 and 100 denier with cotton staple yarn having a fineness greater than 134,000 yards per pound to form a composite yarn, weaving a fabric from the composite yarn and thereafter washing the fabric in an alkaline bath to dissolve the alginate yarn.

Textile fabric

Arthur Johnson and John Bamber Speakman (to Alginate Industries Limited), U. S. P. 2,592,153, April 8, 1952.

A process of making a fabric, which comprises twisting calcium alginate yarn having a fineness of between 75 and 125 denier with worsted-spun yarn having a fineness greater than 31,360 yards per pound to form a composite yarn, making a fabric from the composite yarn and thereafter washing the fabric in an alkaline bath to dissolve the calcium alginate yarn.

Fabric applications C 6

Cotton filled structural material and process of preparing the same

H. S. Busby and W. L. Ward. U. S. P. 2,587,-591, March 4, 1952.

The materials are prepared by mixing: cotton fibers; a catalytic amount of a peroxide, such as benzoyl peroxide; and a diallyl ester of a polybasic acid, such as maleic acid, maintaining the mixture at an elevated temperature until the cotton fibers swell, adding a polymerizable vinyl chloride resin, allowing the resultant mixture to gell, removing the solvent, and further polymerizing the gell.

Pile fabrics

R. Laing (Paerse-Laing, Ltd.); *Rubber Abs. 30*, 309 (July 1952), B. P. 670,254 (December 29, 1948).

The fabric is made up of a sheet of plastic or rubber as a sheet coated with plastic or rubber, and loops of spun yarn having bends which are adherent to the sheet. A woven tape adherent to the sheet extends along one or more edges. There may be perforations betwen the points or lins of adhesion of the loops.

Pile fabrics

P. Shaw. *Rubber Abs. 30*, 309 July 1952, B. P. 670,334 (April 16, 1952).

The method consists in locking pile-forming yarns, fibers, or filaments in folded or loop formation to a foundation which may be a rubber or rubberlike composition or a plastic, by supporting the folds or loops in spaced formation in channels into which part of the foundation is caused to flow and then set around the fibers by vulcanization or like hardening process.

STANDARD FINISHING D

High-temperature fixing of fully synthetic fibers

F. Fourne. *Melliand Textilber. 33*, 639-43 (1952); *in German.*

The author deals with the conditions of high temperature fixing of nylon and perlon fibers in order to make them firm and crease resistant and to get the proper feel. The most favorable conditions of the various fixing procedures by means of steam are described and the importance of a cold treatment by which the high-temperature fixing should be followed is pointed out.

Padder mangle or squeezer rolls for improved extraction and impregnation of textile fibers, yarns, and fabrics

J. F. Keating and E. J. Keating. U. S. P. 2,596,154, May 13, 1952.

The rolls have a rigid hard core covered with a layer of soft rubber, from about 1/16 to ¼ inch in thickness, having a hardness of from about 100 to 200 as measured with a Pusey and Jones plastometer using a ⅛ inch bolt. The rolls cause a markedly greater penetration of liquid into interstices and cause an unusually complete removal of liquid from fibers, yarns, and fabrics.

Uncurling the edges of knitted rayon fabrics

British Celanese Ltd.; Brit. *Rayon and Silk J. 29*, 66 (July 1952), B. P. 669,421, (April 2, 1952).

A new device is described in which the two opposite edges of the fabric are brought together in the curled state, one over the other as they pass forward for stitching together a transverse endless band, moving between the two layers, unrolls the edges.

DYEING AND PRINTING E

Color shading and grading

Warren B. Reese. *Textile Industries 116*, 87-90 (August, 1952).

See front section.

Dyeing at high temperature

L. Drijvers. *Amer. Dyestuff Reporter 41*, 533-39 (September 1, 1952).

A study of the principle of high-temperature dyeing. A machine has been devised for dyeing at temperatures above 212° F. In this method of dyeing, the temperature is increased as rapidly as possible in order to reach the point where high temperature promotes more rapid diffusion of the dye into the fiber and consequently, the rapid arrival at the physico-chemical equilibria, which is necessary for achieving perfect levelness in dyeing rayon cakes.

Metal-containing direct dyes

Ciba Ltd.; Brit. *Rayon and Silk J. 29,* 68 (July 1952), B. P. 670,522 (April 30, 1952).

The new water-soluble dyes are made from complex metal-containing dyes by treating them with ammonia or a water-soluble organic base in such a manner that the ammonia or base enters into the dye complex to confer sufficient solubility for dyeing purposes but only temporarily for in the dyebath the new dye complex breaks down under conditions whereby the original complex metal-containing dye is re-formed to be simultaneously adbsorbed into the cellulose fiber while the split off ammonia or organic base dissolves inthe dyebath.

Oxidation-reduction potentials of vat dyes

R. H. Peters and W. J. Marshall. *Bull. Inst. Text. Fr. No. 30,* 415-38.

A detailed account of the reduction characteristics of vat dyes and their importance in vat dyeing is given. These characteristics are determined by the oxidation-reduction potentials, and the speed of reduction. Both are intrinsic properties of the dye itself. The following aspects of the subject are dealt with: (1) the relative importance of the speed of reduction and the reduction equilibrium; (2) the relation between the oxidation-reduction potential of dyes and their printing properties; (3) the theory of oxidation-reduction potentials; (4) measurement of the potentials; and (5) speed of reduction and its measurement.

SPECIAL FINISHING F

Anti-shrinkage treatment

Hugh vom Hove (Walkden Makin and Co. Ltd.), U. S. P. 2,608,494, (August 19, 1952).

A process for imparting anti-shrinkage properties to regenerated cellulose fabrics comprises treating the fabric in a weak organic acid bath containing ammonia and an organic amine base and then treating it in a second bath containing formaldehyde and an antimony salt of an organic acid.

Apparatus for treating fabrics in continuous lengths with liquids

Thomas H. Hilliard, (to Celanese Corporation), U. S. P. 2,591,815, April 8, 1952.

In apparatus for the treatment of fabrics with a liquid medium, the combination with a vat for holding a relatively large body of liquid medium, of a vessel positioned above the vat, a funnel operatively connecting the vessel and the vat, means

for continuously circulating the liquid medium between the vat and the vessel at a predetermined rate, the liquid circulating means including a variable speed pump, piping on the suction side of the pump leading to the vat, and slotted discharge pipes in the vessel connected to the pump on the discharge side thereof, means, including a driven reel, for passing a fabric to be treated through the vessel and the funnel and into the vat in a vertical, downward direction, a curved guide plate in the vat contiguous to the discharge end of the funnel for receiving the fabric directly as it leaves the funnel, a pair of baffles dividing the vessel into separate, liquid-receiving compartments each containing one of the slotted discharge pipes, the baffles continuing downwardly below the vessel to form the funnel and being adapted to guide the fabric therebetween while directing the liquid medium flowing through the baffles against the fabric as it passes through the vessel and funnel into the vat, and a plurality of baffles in each of the compartments at right angles to the vessel-dividing baffles, and a driven reel for withdrawing the treated fabric from the vat.

Creaseproofing rayon fabrics

O. J. Meijer's Dextrinefabrieken N. V., B. P. 676,419, (July 30, 1952).

A process for crease-proofing materials of regenerated cellulose comprising impregnating the fabric with a solution in water of an aldehyde and a nitrogen-containing reaction product of polyhydric aldehyde-or ketone-alcohols with at least 4 carbon atoms in the molecule with (A) a urea or a thiourea, or (B) with melamines, and with a quantity of an acid, so that during the subsequent heating of the material the pH is not more than 2.

Crease- and shrink-resistant finishes

O. P. Cohen and F. H. Rossin (Monsanto Chemical Co.); Brit. *Rayon and silk J. 29,* 66 (July 1952), B. P. 669,991, (April 9, 1952).

A mixture of formaldehyde and melamine is maintained at pH 9.3 to 80°C. until a slear reaction product is obtained; the product is then spray-dried at about 80°C. so as to obtain an amophus solid having ready solubility in water. This intermediate resin is stirred into water at 75°F. saturated with chlorine and containing a dispersing agent and zinc chloride. The fabric is padded with the liquor then dried and cured.

Daylight fluorescent textiles

Jos. L. Switzer and Richard A. Ward, U. S. P.

2,606,809 (August 12, 1952).

Process of dyeing to produce a daylight fluorescent fabric comprises dissolving a daylight fluorescent dye in an aqueous alcoholic solution, immersing the fabric therein, maintaining the bath temperature below that required to swell the filaments to coalescence, and washing the fabric with cold water.

Fireproof, waterproof cellulosic sheeting

Wm. H. Aiken and Albert L. James (United States), U. S. P. 2,606,131 (August 5, 1952).

A fireproof, waterproof, cellulosic sheeting resistant to vesticant agents having a coating of one layer of ammoniated water solution of formalin-cured casein and a fireproofing and plasticizing agent such as monoethanol phosphate or ammonium butyl phosphate.

Flameproofing

Morris L. Nielsen and Howard K. Nason (Monsanto Chem. Co.), U. S. P. 2,603,614 (July 25, 1952).

The after-glow of rayon may be reduced by the application of a phenolic resin mixed with the reaction product of melamine and phosphoric pentoxide.

Geometry of knit fabrics and its relationship to shrinkage

Hazel M. Fletcher and S. Helen Robert. *Textile Res. J. 22,* 466-71 (July 1952).

The geometry of six plain, six rib, and three interlock circular knit fabrics made of staple fibers of viscose, acetate-viscose, and nylon has been studied. Data on both gray and finished fabrics for stitch length, diameter of yarn, and wale and course spacings were used in evaluating the equations derived by Peirce for length of yarn in one stitch and for wt. per unit area. In laundering tests, it was found that the various yarns shrank or stretched less than 3% in the finished fabrics. Shrinkage in area increased with knitting stiffness for all of the gray fabrics and for the finished viscose; but, for the finished acetate-viscose and nylon, shrinkage in area usually decreased as the knitting stiffness increased.

Manufacture of moisture-proof sheet wrapping materials

Brit. Cellophane Ltd.; *Packaging Abs. 9,* 359 (June 1952), B. P. 669,907 (April 9, 1952).

An aqueous emulsion of vinylidene chloride copolymer contains vinylidene chloride, acrylonitrile, sodium salt of long chain alkyl aulphates, ammonium persulphate, sodium metabisulphate and water. A laminated sheet of regenerated cellulose is immersed in it. After being stripped off the sheet, dried and consolidated, the film is formed.

Methods and apparatus for the continuos setting of knitted fabrics formed of thermoplastic material

Karl E. Pannaci, (Lee Dyeing Co.), U. S. P. 2,591,861, April 8, 1952.

The method of continuously setting an elongated, knitted fabric formed of a thermo-plastic material, such as nylon, and having transversely-extending courses therein, which comprises securing the longitudinally-extending, marginal edges of the fabric in relatively fixed, parallel-disposed relation at closely spaced points thereof with the ends of each course substantially directly opposite each other; continuously moving the fabric in a longitudinal direction; heating the moving fabric to a temperature at least equal to its stabilizing point as it passes through a zone of limited extent longitudinally of the fabric; and maintaining the transversely-extending courses, while moving through the zone of heating, in approximately the same relative position as before entering the zone, by applying tension in the direction of movement of the fabric in zones thereof intermediate the marginal edges.

Methods of making partially carboxymethylated or phosphorylate cellulosic fibrous materials crease resistant and dye resistant

G. C. Daul and J. D. Reid, U. S. P. 2,584,114, February 5, 1952.

The method comprises impregnating the materials with an acid-polymerizable substance, such as a melamine-formaldehyde precondensate, and heating to polymerize the latter, in the absence of an added external catalyst. The method produces cloths which are free of acid-induced degradation and possess excellent hand, abrasion resistance, and other properties.

Moistureproofing coating for cellophane

Wm. Berry, Chas. P. Oswin and Edward G. Sanderson (Brit. Cellophane Ltd.), B. P. 675,673 (June 22, 1952).

A moistureproofing coating composition for for cellophane comprising nitrocellulose, wax, and an artificial resin produced by the heating of rosin with an aliphatic polyhydric alcohol and subsequently with a saturated dibasic aliphatic car-

boxylic acid.

Phosphorus compounds as fire retardants

Anon. *Textile Recorder*, 90 (June 1952).

Greater fire-resistance could be imparted to textiles through the use of some of the newer phosphorous compounds. The compounds possessed the advantage of greatly retarding both flame and glow propagation so that materials impregnated with relatively small amounts of these compounds were rendered both flame and glow resistant when exposed to ignition or heat sources, thus helping to prevent the spread of fire.

Resin impregnated textile fabrics and process of producing same

Arnold Silver (to Betex Sales Corporation), U. S. P. 2,593,207, April 15, 1952.

A process for producing embossed resin impregnated cellulosic fabrics having a finish fast to washing and dry cleaning, which process comprises applying to the fabric a solution of Nalkoxymethylpolyamide resin containing from 1% to 3% by weight of the resin in an aliphatic alcohol solvent containing an acidic catalyst os that the fabric absorbs from 60% to 100% of its weight of the solution, partially drying the thus impregnated fabric at a temperature not exceeding 250 degrees F. to produce a resin impregnated fabric containing from 10% to 20% liquid based on the dry fabric at a temperature of 250 degrees to 375 degrees F., and curing the embossed resin impregnated fabric at a temperature of 250 degrees to 350 degrees F. for from 4 to15 minutes.

Spreading apparatus for flattening tubular fabric

Clarence Yost, Hazleton (to Y & S Mfg. Co.), U. S. P. 2,591,903, April 8, 1952.

A spreading device for flattening traveling tubular fabric, comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, the spreader elements being axially overlapped and connected, the spreading device being adapted for internal engagement with the fabric tube whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of the fabric tube on the spreading device.

The resin aftertreatment of direct cotton dyes

G. H. Lister. *Textile Recorder*, 89-90 (June 1952).

In this article, the author discusses some of

the potential difficulties inherent in resin aftertreatments and how they may be overcome. The principal subjects discussed are these: the effect of alkali, effect of resin concentration, use of standing liquor, and obtaining a correct shade.

Urea-formaldehyde fixation on viscose rayon

R. F. Nickerson. *Amer. Dyestuff Reptr. 41*, 482-86 (August 4, 1952).

A laboratory study of the washfastness of urea -formaldehyde resin on viscose is reported. However, since a close correlation between washfastness of the resin as measured by weight-loss or nitrogen methods and fabric shrinkage cannot be attained, the success of the treatment should be judged by physical rather than chemical tests. Tables and graphs resulting from the investigation are presented.

Water-repellent treatment

Arthur J. Barry (the Dow Chemical Co.), U. S. P. 2,608,495 (August 19, 1952).

A method for rendering fabrics of cellulosic material such as cellulose acetate or cotton water repellent consists of treating the fabric with an organo-silicon ester and heating the treated material to a temperature at which a carboxylic acid is evolved.

Water-repellent treatment

C. S. Miner, Jr. (Minnesota Mining and Mfrg. Co.), *Packaging Abs. 9*, 364 (June 1952), B. P. 669,030 (March 26, 1952).

Textiles may be made water-repellent by treatment with an organic compound of silicon containing at least 1 non-hydrolyzable tertiary carbinoxy group and at least 1 readily hydrolyzable nitrogen-containing group attached to the silicon atom. Each readily hydrolyzable group forms on hydrolysis a non-acidic reaction product.

Water-repellent treatment

Alton A. Cook, Nathaniel C. Shane and Ernest B. Whitworth (Arkansas Co., Inc.), U. S. P. 2,603,576 (July 25, 1952).

Textile materials are rendered water-repellent by treatment with an emulsion of a wax and a fatty acid soap, drying, then treating with an aqueous acid bath containing zirconium acetate, and drying, one of the treatments containing also a water-soluble urea-aldehyde resin precondensate.

TESTING AND MEASUREMENTS G

Instruments and Instrumentation G 2

Automatic yarn load-elongation recorder

F. B. Breazeale and H. D. Irvin. *Textile Res. J. 22,* 549-52 (1952).

An apparutus for recording the load-elongation properties of yarns is described. Essentially it subjects a length of yarn or staple to a constant rate of elongation to break, or to repeated cycling of extension and retraction between either predetermined loads or elongations. Automatic recording of the latter traces at logarthmic intervals may be employed, and an automatic 1-min. delay between cycles at zero extension or zero load may be used if desired. Several traces obtained with this equipment are shown to illustrate its performance.

I T. F. M. abrasion machine

A. Marti. Bull L'Inst. *Textile de Fr. No. 32,* 8-18 (1952); *in French.*

By means of the I. T. F. M. abrasion machine, it is possible to plot the curves of progressive wear of fabrics under well-defined conditions by a sufficiently precise method consisting of periodically weighing the fluff produced during tests.

Instrument measures tensile strength and elongation

Chem. and Eng. News 30, 3545 August 25, 1952.

An instrument for measuring both tensile strength and elongation of small tufts of fibers has been developed by the University of Tennessee fiber research laboratory in Knoxville. As in other practical testers, a small tuft of fibers is gripped between two pairs of specially designed jaws spaced a short distance apart. By a pendulum-type mechanism an increasing load is applied to one pair of jaws until the fibers break. The new tensile tester, called the stelometer has the advantage over previous fiber testers of measuring both tensile strength and the elongation or stretch obtained prior to break. Since fiber elongation is an important factor in the ability of fabrics to stand hard wear, the tester should prove valuable in selecting cottons especially suited to this use.

Recording fluctuating tensions in textile yarns

Anon. *Textile Recorder,* 115 (June 1952).

A new unit, called the tension pick-up unit, has recently been developed by Kelvin and Hughes of London to work in conjunction with the company's single channel strain recorder, thus

enabling it to be used to provide an instantaneous graphic record of tension fluctuations. The unit consists fundamentally of a small cylindrical transducer of the inductance (variable reluctance) type, in which an armature is suspended by spring diaphragms between a pair of coils. Incidentally, the equipment—in conjunction with some means for applying a constant rate of extension, can also be used for obtaining load-extension curves for fibers.

Regularity measurements on slivers, rovings and yarns

G. Quintelier. *Bull. Inst. Textile Fr. No. 30,* 37-53 (1952).

The physical and statistical interpretation of regularity measurements on slivers, rovings and yarns is analyzed. A comparison is made between the regularity of slivers, rovings and yarns from an ordinary spinning process and those from a Casablancas high draft system in which the intermediate frames were eliminated. The article has three sections: (1) the planning of measurements; (2) the evaluation of the traces obtained by the Uster yarn irregularity tester; and (3) the physical and statistical interpretation of the measurements.

Testing of water-repellency

E. Marianne Karrholm. *J. of Textile Inst. 43,* P. 263-89 (1925).

A new testing apparatus of the artificial rainfall type, designed by the Swedish Institute for Textile Research, is described as well as the investigations forming the basis of the testing method. This method is compared with other test methods.

TEXTILE MILLS H

A new multi-brush air filter

Anon. *Textile Recorder,* 110 (June 1952).

This new filter employs as its filtering element a series of brushes which present a screen of finely graded intermingling hairs to intercept and trap dust from the air in its passage through the filter. The materials used in the manufacture of the filter brushes are specially selected to withstand the varying humidity and conditions of dust-laden air. The initial filtering efficiency of the brushes is still retained after cleansing.

Address of president of Southern Textile Association

J. L. DeLany. *Textile Industries,* pages 67-68

(August 1952).

See front section.

Cloth mills step up schedules as retailers restock their shelves

Anon. *The Wall Street Journal* (August 26, 1952).

See front section.

How big are profits

Anon. *The Joanna Way* (August 1952).

See front section.

Information racks provide helpful service to Huntsville's employees

A. D. Elliott. *Textile Industries 116,* 94-95 (August 1952).

See front section.

New developments in measurement of high relative humidities

W. R. Steiger. *Science 114,* 152-3 (August 10, 1951); *Packaging abs. 9,* 367 (June 1952).

Details are given of the construction and operation of an electrical hygrometer for the measurement of high relative humidities. It consists of a coil of platinum wire coated with a lithium chloride-polyvinyl alcohol film. Changes in relative humidity produce corresponding changes in the resistance of the element.

Stretching automatic motions to the limit

Staff. *Textile Industries 116,* 100-103 (August 1952).

See front section.

CHEMISTRY AND PHYSICS OF TEXTILE MATERIALS I

American Chemical Society

Chem. and Eng. News 30, 3393-3427 (August 18, 1952).

The final program for the 122nd National Meeting of the ACS has been published. The meeting will be held in Atlantic City, Sept. 14-19th.

Analysis of staple fiber mixtures

D. C. Fisher and E. D. Roberts. *Textile Res. J. 22,* 509-12 (1952).

Methods were developed for the qualitative and quantitative analyses of staple fiber blends containing acetate, dynel, wool, nylon, viscose rayon, cotton, Orlon acrylic fiber, and Dacron polyester fiber in any combination. The qualitative analysis involves determination of density

and miscroscopic appearance; the quantitative analysis employs selective solvents.

Analytical methods for determining the presence of polyacrylic compounds

H. Rath, G. Nawrath and E. Schonpflug. *Melliand Textilber. 33,* 636-9 (1952); *in German.*

Analytical methods for determining the presence of polyacrylic compounds on the fiber are described. The hydroxylamine test is given as a preliminary test for distinguishing between polyacrylates and polymethacrylates, and the phenylhydrazine test as a specific reaction for polyacrylates. In contrast to polymethacrylates,, polyacrylates are characterized by their ready saponifiability; on the other hand, polymethacrylates can be depolymerized readily and without decomposition.

Attack of cellulose by solutions of sodium chlorite—Parts III and IV

F. Kocher. *Bull L'Inst. Textile de Fr. No. 32,* 19-103 (1952); *in French.*

The structural modifications of cellulose oxidized by chlorite have been examined and it was shown that cellulose is not attacked by solutions of acid except under very exaggerated conditions. A peculiar characteristic of the oxycelluloses was that they have ester links at 1-4 of the oxydized cellulosic chain. This condition was shown by the oxydation by acid chlorite of the trimethylcelluloses and of the heptamethyl methylcellobioside.

Birefringence and refractive index of synthetic fibers

A. N. J. Heyn. *Textile Res. J. 22,* 513-22 (1952).

Birefringence and refractive indices of synthetic fibers are measured by the polarization color and immersion methods. These properties prove to be much more consistent and characteristic for synthetic fibers than for natural fibers and rayons, to which previous studies had mainly been confined. A simple polarizing device for making these measurements using an microscope is described.

Cyclic recurring constant elongation limitation

Walther Wegener. *Melliand Textilber. 33,* 656-660 (1952); *in German.*

The results are discussed of dynamic fatigue tests carried out on viscose rayon according to the principle of cyclic recurring constant limit of extension. For carrying out these investigations,

a measuring apparatus in which the load increases and decreases in proportion to the time was used. The phase diagrams in this paper, which characterize the viscose rayon tested for dynamic fatigue over the whole range of strain, give a particularly clear picture of the three variables Time—Total extension—Tension,Time—Total extension—Permanent extension, and Time—Total extension—Elastic extension.

Decomposition of cellulose

S. N. Basu and S. N. Ghose. *J. Textile Inst. 43,* 278-89 (1952).

Decomposition of cellulose is favoured by such physical factors as increased surface and a low crystalline-amorphous ratio. Decrease in chain length had no effect within the limits of these experiments. On the contrary, hydrocellulose was found to be more resistant, which may be due to increased crystallinity or removal of sugar-like substances as envisaged by Pacsu. The differences in availability between forms of cellulose suggest the existence of other yet unknown aspects of the physical and chemical structure of cellulose which have a bearing on its biological decomposition. The formation of the cellulose-splitting enzyme is stimulated by the presence of hemi-cellulose and the enzyme may be to some extent specific for the fungus.

Effect of humidity on cross-sectional swelling of fibers

F. F. Morehead. *Textile Res. J. 22,* 535-39 (1952).

A method has been developed for studying the effect of humidity on the cross-sectional swelling behavior of textile fibers. The technique has been used on the following fibers: silk, wool, cotton, mercerized cotton, viscose rayon, viscose rayon staple, cuprammonium rayon, a highly crystalline and highly orientated viscose rayon fiber, Lillienfield, and cellulose acetate rayon. In addition to the hysteresis "loops", the most striking phenomenon observed was the great increase in swelling between 97% R. H. and wetting in the case of the rayons and cotton.

Fiber Society

Daily News Record, p. 2, , August 14, 1952.

The meeting of the Fiber Society will be held at Princeton, N. J. on Sept. 10th and 11th. "Decomposition of Soil on Various Textile Fibers", "The Physics of Water-Repellent Fabrics", and discussons on friction studies are among the papers to be presented.

Influence of the structure of cellulose on certain properties of regenerated fibers

C. Centola. *Bull. Inst. Text. Fr. No. 30,* 131-39 (January 1952); *in French; Brit. Cotton Ind. Res. Assoc. 32,* 558 (July 31, 1952).

Experiments on the effects of artificial ageing were carried out on regenerated celluloses from linters, confers, broad-leafed plants, and annuals. Both the bisulphate acid and the acid hydrolysis-sulphate extraction procedures were used. The samples were desulphurated and bleached. Tables list for each cellulose sample the content of alpha-cellulose, beta-cellulose, cellulose, pentosans, resistant pentosans, lina ash, the average degree of polymerization, the solubility in benzene, the loss of whiteness and the reduction in the degree of polymerization after ageing; also the strength and the per cent loss of strength in the raw and bleached samples. Rayon is found to become slightly stronger during dry ageing. Rayon prepared from linters showed greater resistance to ageing effects than that prepared from the other sources. Rayons prepared by sulphate extraction were more stable than those from celluloses treated with bisulphite.

Mechanical and chemical sizing of pure viscose and viscose blended with acetate

P. Swillens. *Rayonne et fibres synthet. 8,* 34-44 (1952); *in French; Chem. Abs. 46,* 6839 (1952).

The dimensional stability of spun viscose fabrics blended with acetate is fairly good. Shrink resistance can be achieved by acid-HCHO, acetone-HCHO, urea-HCHO, and glyoxal treatment. Their effect is demonstrated by swelling data and by the resin content of fabrics before and after laundering.

Mechanisms of the deformation of fibers

O. Kratky, G. Porod and E. Treiber. *Z. Elektrochem 55,* 481-90 (1951); *J. Soc. of Dyers and Col. 68,* 276 (1952).

An account of work with idealized models which give orientation of elongated particles on stretching. The x-ray diagrams obtained with regenerated cellulose required the assumption of lamellar or ribbonlike micelles, but this seemed to be contradicted by certain observed orientations. A model is suggested in which the micelles are joined to each other through laminar regions, so that relative rotation is possible only around a transverse axis parallel to the plane of the ribbon. This illustrated in detail by diagrams.

Mercerization of cellulose

Bengt. G. Ranby. *Acta Chem, Scand. 6 No. 1,* 101-115 (1952) ; *Brit. Cotton Ind. Res. Assoc. 32,* 551 (July 31, 1952).

Based on published data. the enthalpy and entropy effects upon mercerization of cellulose are discussed and a thermodynamic interpretation of the mercerizing is proposed. If the author's views are accepted and applied on available data, the conversion of wet native to wet mercerized cellulose is an exothermic and natural process. The stability of native and mercerized cellulose at different temperatures, conversion experiments in nitro and the synthesis of cellulose in vivo are discussed in connection with the thermodynamic interpretation.

Mercerization of cellulose—II

Bengt G. Ranby. *Acta Chem. Scand. 6, No. 1,* 116-27, 128-38 (1952) ; *Brit. Cotton Ind. Res. Assoc. 32,* 552 (July 31, 1952).

The mercerization of cotton and wood cellulose has been studied as a phase transition problem, that is, the transition of cellulose I to cellulose II. Two techniques were employed, x-ray diffraction and electron diffraction. The results of this investigation emphasize the difference between wood and cotton cellulose. It is concluded that the difference between wood and cotton cellulose is due not only to the fibre morphology or the possible impurities but also to the properties of the submicroscopic structure elements, the micelle strings, from which the cellulose micelles are derived.

Mercerization of yarn

Chas. F. Goldthwait, A. L. Murphy, I. W. Lohmann and H. O. Smith. *Textile Res. J. 22,* 540-48 (1952).

Apparatus is described and general methods are indicated for the study of the process of mercerization of cotton yarn in skeins. Special techniques, including the use of a strain gage, are given for measuring the tension developed in yarn during mecerizing. This indication of the swelling of cotton is expected to supplement the usual observations of mercerized yarn properties—luster, dyeing capacity, and strength—to help breeders and prospective users of new cottons in their selections. Observations of developed tension can also be employed to indicate the rate of mercerizing as the caustic penetrates and swelling causes tension to build up in the yarn, and to show differences between yarns and processes even more readily than between cottons.

Movement of water vapour through textiles

N. Gralen and G. Werner. *Bull. Inst. Textile de Fr.. No. 30,* 379-85 (1952) ; in French.

The authors have studied water vapour transport through textiles and the influence of fiber water content on the transport. Water vapour is found to pass mainly via the pores in the weave, but in synthetic fibre fabrics. It also passes via the water absorbed on the surface of the fibers.

Optimal twist in staple yarn

E. Alexander. *Textile Res. J. 22,* 503-8 (1952).

The equations of mechanical equilibrium of a single stretched fiber in the staple yarn compound have been established, and the conditions for optimal twist derived there-from, making certain assumptions regarding random tangle. For fibers of 0.02 mm. diameter and 8mm. length and with a friction coefficient of 0.2, a "twist angle" of 41 degrees was calculated. For longer staple fibers, agreement with experimental results can be improved by assuming the presence of additional friction zones along each fiber.

Polyacrylonitrile fibers

Henry S. Rothrock (*E. I. duPont de Nemours and Co.*) U. S. P. 2,605,258, July, 29, 1952.

To give synthetic fibers of acrylonitrile polymers good dye receptivity which will maintain their color stability at elevated temperatures, a copolymer of acrylonitrile with allyloxyethanol is used.

Polyacrylonitrile spinning solution

Arthur Crosswell (American Cyanamid Co.) U. S. P. 2,605,246, July 29, 1952.

A solution of an acrylonitrile polymer for spinning yarn is produced by dispersing the polymer in water-soluble salt solution of less concentration than that required to dissolve the polymer and thereafter more salt is added to give the concentration required to dissolve the polymer.

Reducing the crystallinity of native fibrous cellulosic material

K. Ward, Jr., C. M. Conrad, and L. Segal U. S. P. 2,580,491, January 1, 1952.

Invention relates to immersing the material in certain anhydrous liquid amines, preferably ethylamino, and the removing the amino with a non-polar solvent, which lowers the crystallinity to about 25-35% without changing the x-ray pattern of the material from that of native cellulose.

Structural changes occurring in viscose rayons by stretching

C. J. Pinte, P. Rochas and J. Henno. *Bull. Inst. Fr. No. 30,* 141-74 (January 1952); *in French; Brit. Cotton Ind. Res. Assoc. 32,* 558 (July 31, 1952).

A detailed study is reported on changes in weight, dimension and chemical reactivity toward a compound acting in an inert and anhydrous medium occuring in rayon samples which had been drawn to different degrees during spinning and subsequently conditioned at different humidities, wetting included. The results show that (1) the properties of rayon filaments vary with their water content; (2) that the bound water is an integral part of the water absorbed during wetting; (3) several successive phases can be distinguished during the uptake of water; (4) prolonged drawing during spinning diminishes axial swelling, stretching during wetting, chemical reactivity and the limits of swelling in water, while diametrical swelling and the differential coefficient of swelling anlsotropy are increased. The effects of different degrees of drawing on the molecular structure of the fibre are shown.

The deformation process in cellulose gels through complete x-ray orientation measurements

W. Kast. *Kolloid Z. 125,* 45-51 (1952).

The laminar form of the cryst. region of cellulose fibers exhibits different values when the cellulose is stretched by different procedures. The laminar effect increases with lower degree of

swelling of the cellulose gel, with increasing concentration of cellulose in the spinning solution, and with higher average degree of polymerization of the cellulose molecules. In the stretching procedure the greater laminar effect is due to tighter reticulation of the cellulose gel; the resultant greater transverse forces cause the laminar effect by placing the laminar planes perpendicular to the fiber radius. The laminar effect also increases with increasing velocity of stretching which causes a simultaneous temperature increase.

The theory of photolysis of textile fibers

A. Sippel. *Melliand Textilber. 33,* 645-49 (1952); *in German.*

Various mathematical formulae for the relationship between tensile and degree of polymerization correspond to the various possible model representations of the photolytical degradation of macromolecules in textile fibers. The representation which is best compatible with the experimental results is also supported by new determination of quantum yields.

TEXTILE EDUCATION AND RESEARCH J

Textile progress through research and education

Anon. *Aberfoyle Bulletin* (March-April 1952).

See front section.

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SPECIAL REPORT

Textile Industries Publishes 16-Page Section on ITT 17-Mill Test Analysis

The October issue of *Textile Industries* magazine carried the complete report compiled by the ITT Research staff on the intra-industry research project known as the 17-Mill Test. This report was written by J. E. Dougherty, L. H. Hance, and W. H. Martin, with a foreword by Jack Compton, Technical Director, and a special section by E. J. Bernet, Head of the Physics Division.

The report was first distributed to member mills by the Institute as Research Report No. 47, and then by action of the Board of Trustees was made available to John Fonville, Editor of *Textile Industries*.

Ample supplies of reprints of this report are available at the Institute, and reprints have also been sent to the American Cotton Manufacturers Institute and to the National Cotton Council, the two agencies responsible for the compilation of the data from which the ITT analysis was made.

This is the first instance of outside publication of an Institute Research Report. Usually these reports are distributed to Member Mills only.

In this instance, it was felt that outside publication was proper, since the ACMI, the NCC and the seventeen cooperating mills had furnished the data. And, of course, some of the seventeen mills were not members of the Institute. The chief difference between the original analysis made by ACMI*[1] and the present one by ITT*[2] was that the first considered the ginning-spinning relationship, and the latter deals with the effect of mill processing conditions and product quality.

Extra Copies of this report are available at the Institute.

While it is impossible to condense this length report for *Digest* readers, we are reprinting Dr. Compton's foreword and extracts of the authors' summary and introduction.

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*[1] "Cotton Fiber Properties, Spinning Efficiency and Fabric Quality as Affected by Ginning Practices," available at the National Cotton Council, Washington, D. C.

*[2] "The Relation of Mill Processing Conditions to Yarn and Fabric Properties—A Study of the 17-Mill Test data obtained on 1950 crop."

Foreword to 17-Mill Test Report

The economics of the Textile Industry are inextricably related to the types, arrangements, and adjustments of the machines employed in cotton processing. The selection of the mill organization and maintenance program to produce a product of a given quality at the lowest cost is a problem which continually confronts mill management. At the present time, this selection largely depends upon the recommendations of machinery manufacturers and men who have had considerable experience in processing cotton. The labyrinth of equipment and conflicting opinions offered by both these well-meaning sources often makes a proper decision extremely difficult. Unfortunately, there are few reliable sources of factual information concerning the relation of mill processing to product quality. The need for establishing such sources through industry-wide research is thus apparent.

One of the first attempts to obtain information concerning the effect of cotton ginning con-

The Relation of Mill Processing Conditions to Yarn and Fabric Properties: A Study of the 17-Mill Test Data Obtained on 1950 Crop

By J. E. Dougherty, L. H. Hance, and W. H. Martin

Summary

This report is concerned with the effects of various processing conditions in seventeen cotton mills making 80 x 80 cloth on the properties of yarns and fabrics produced by the mills. The information concerning the cottons used, mill organizations and test results was obtained from an industry wide test, jointly sponsored by the National Cotton Council and American Cotton Manufacturers Institute, to determine the effects of different ginning conditions on product quality. Since the test was not originally designed to study the effects of manufacturing variables, the results of the investigation of processing conditions cannot be considered conclusive.

ditions upon yarn and fabric properties on an industry-wide basis was the project jointly sponsored by the National Cotton Council and the American Cotton Manufacturers Institute, and currently referred to as the "17-Mill Ginning-Spinning Test". As a by-product of this investigation, complete information was obtained concerning both mill processing conditions and product quality. For the first time, data became available which enabled these two factors to be correlated The present report summarizes the findings made by a group at the Institute of Textile Technology and presented before representatives of participating mills and guests at the Eight Annual Membership Meeting held at the Institute on April 30, 1952. The data are presented in such a way that they should be of particular value to the mill man. The usefulness of the data would undoubtedly have been increased had a control cotton been processed by each of the participating seventeen mills. It is hoped, however, that the data and conclusions presented will stimulate sufficient interest to cause further industry-wide tests to be made so that the information now greatly needed by the mills will be made available.

The Institute is ready at all times to assist member mills in acquiring data of this type which will enable them to improve their economic position in the Textile Industry. (By Dr. Jack Compton, Technical Director.)

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12 NEW STUDENTS REGISTERED AT ITT

The sixth academic year at the Institute of Textile Technology began officially this morning with the opening of classes for 12 new student and nine second-year students.

The orientation program, which began Thursday, included the registration of new students, conferences, and a tour of the Institute. Registration of second-year students, conferences and orientation talks, and a reception for new students and their families took place Friday.

Work at the school is specialized for masters' degrees in textile technology. All students enrolled hold bachelor of science degrees.

First-year students are as follows: Earl Bilsky, Frank R. Borges, Jr., and Joseph C. Raposa, of Fall River, Mass.; Mr. Edward Driscoll, Whitinsville, Mass.; George Z. Dunn, Jr., Pascoag, R. I.; Robert S. Merkel, Philadelphia; George A. Mobley, Simpsonville, Ga.; William E. Moss, Waynesboro, Va.; Edward C. Oliva, Providence, R. I.; William T. Waters, Camden, S. C.;

(Continued on page 4, col. 1)

Rather, the conclusion derived from the data should be regarded as indicative of relationships which may exist between methods of manufacture and quality of products. These trends should be more thoroughly investigated in tests specifically designed to show these relationships.

Bearing in mind these limitations, the results of the study support the following trends.

1. There is a correlation between yarn uniformity and yarn strength, the more uniform yarns being stronger yarns, the less uniform yarns being weaker.

2. Yarn strength affects fabric strength. Usually the stronger yarns produce the stronger fabric.

3. More uniform and stronger yarns can be produced from higher doublings throughout processing and from lower drafts during spinning.

4. There is a highly significant correlation between neps per grain in card web and imperfections per grain in yarn.

5. Fewer neps in card web result from:
   a. less handling and beating in opening and picking,
   b. lower production rates on the picker,
   c. Lighter weight laps being fed to the card,
   d. lower drafts in carding,
   e. lower doffer speeds in carding,
   f. producing heavier weights of sliver on the card,
   g. removing larger percentages of the total waste during carding,
   h. removing larger amounts of fiber with trash during opening, picking and carding.

Introduction

At some time prior to the harvesting of the 1950 cotton crop, the National Cotton Council of America, assisted by the American Cotton Manufacturers Institute, undertook a study to investigate on a commercial scale the effects of various ginning conditions on the spinnability of cotton and on the quality of finished products. The study was conducted on 1950 crop cottons from two areas of growth. The variables that were investigated included methods of harvesting, types of ginning equipment and processing conditions at the gins. The various cottons under study were distributed to 17 selected mills where they were spun into yarns and woven into 80 x 80 print cloth according to regular production methods. The results of the test, showing the effects of various ginning conditions, have been

(Continued on page 4, col. 2)

TEXTILE MILLS TEAM UP FOR RESEARCH PROJECTS

By encouraging cooperative research of "brass tacks" variety at the mill level, the textile industry is furnishing new aids to science in the ceaseless effort to gain more knowledge of manufacturing processes and their problems.

Many companies conduct individual scientific studies in their own private laboratories, while the industry supports several cooperative research centers. In the newest move ahead, however, mills are joining together to offer their workaday production facilities as test areas for investigations by scientests.

One outstanding example of this latest approach to research is the "17 Mill Test" to show the relationship between textile mill processing conditions and resulting qualities in yarns and fabrics. Data from 17 companies has been gathered and analyzed by the Institute of Textile Technology at Charlottesville, Va., for the benefit of the entire industry.

The study grew out of an original 17-mill test sponsored by the National Cotton Council of America and the American Cotton Manufacturers Institute, a project which determined the effects of different ginning conditions on product quality.

Experts at the Institute of Textile Technology then used the same data to find out how and why the various mill processing operations, such as opening, carding, drawing and spinning, affect the qualities of yarn and cloth. The ITT analysis, now being made public, is said to be the first study possessing sufficient data to check the effectiveness of many of the accepted processing methods as well as to indicate the possible effectiveness of newer practices.

For the first time the industry now has an abundance of evidence, garnered in the mills themselves, with which to prove that qualities in goods are directly influenced by varying practices and conditions of manufacture. Some of the findings were:

1. There is a correlation between yarn uniformity and yarn strength. The more uniform yarns were found to be stronger, the less uniform yarns weaker.

2. Yarn strength affects fabric strength. Usually the stronger yarns produce the stronger fabric.

3. More uniform and stronger yarns can be produced from higher doublings, that is, more frequent combining of strands of stock, throughout processing; and from lower drafts during spinning.

4. There is a highly significant correlation between the number of small fiber tangles called neps per weight unit in card web, and imperfections per weight unit in yarn.

5. Fewer neps in card web result from less handling and beating, lighter-weight laps being fed to the card, lower drafts in carding, lower doffer speeds in carding, producing heavier weights of sliver on the card, removing larger percentages of the total waste during carding, and removing larger amounts of fiber with trash during opening, picking and carding.

These and other results of the test confirm that definite correlations between manufacturing variables and product quality exist, the ITT report states.

The study had its beginning prior to the harvesting of the 1950 cotton crop, as the result of a long-standing need for an investigation on a commercial scale of the effects of various ginning conditions on the spinnability of cotton and on the quality of finished products. The National Cotton Council chose for study quantities of fiber from two areas of growth, representative of rain and irrigated growing conditions. Factors given scrutiny included methods of harvesting, types of ginning equipment and processing conditions at the gins.

The cottons under study were then distributed to 17 selected mills, whose assistance had been enlisted by the American Cotton Manufacturers Institute. Yarns were spun and woven into 80x 80 print cloth according to regular production methods of each mill. Last March the National Cotton Council published a report on the ginning-spinning study.

Meanwhile, the Technical Advisory Committee of the Institute of Textile Technology had already initiated a further study of the data, from the point of view of mill organization, to explore the effect of various mill processing conditions on the quality of products made from the test cottons.

The researchers had the use of detailed information concerning mill organizations, operating procedures, machine speeds and settings, as well as the results of numerous individual mill tests of yarn and fabric properties.

The Technical Service Division of the American Cotton Manufacturers Institute, representatives of the 17 participating mills and ITT personnel worked as a team to gather complete data on the organizations used by the 17 mills and

MILLS

other pertinent information. The material was then screened and analyzed, in one of the widest-scale studies of its kind in textile industry history.

Manufacturing concerns which assisted in the test were:

Abney Mills, Greenwood, S. C.; Alice Manufacturing Company, Easley, S. C.; Borden Mills, Inc., Kingsport, Tenn.; Calhoun Mills, Calhoun Falls, S. C.; Chicopee Manufacturing Corporation, Gainsville, Ga; Clinton Cotton Mills, Clinton, S. C.; Dan River Mills, Danville, Va.; Fieldcrest Mills, Spray, N. C.; Gaffney Manufacturing Company, Gaffney, S. C.; Greenwood Mills, Greenwood, S. C.; Inman Mills, Inman, S. C.; Joanna Cotton Mills Company, Joanna, S. C.; Monarch Mills, Union, S. C.; Orr Mills, Anderson, S. C.; Pacific Mills, Lyman, S. C.; Pelzer Mills, Pelzer, S. C.; and Startex Division of Spartan Mills, Startex, S. C. (*Textile Bulletin*, October, 1952).

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REPORT

(Continued from page 2)

published in a National Cotton Council of America report, dated March 31, 1952, entitled "Cotton Fiber Properties, Spinning Efficiency and Fabric Quality as Affected by Ginning Practices."

At the January, 1952 meeting, the Technical Advisory Committee of the Institute discussed the 17-mill ginning spinning test. Members of the committee believed that much valuable information on the effects of ginning conditions on yarn and fabric quality was obtained as a result of the test and that further study of the data from the point-of-view of mill organization would be of interest to the Institute membership. Since detailed information was available concerning mill organizations, machine speeds and settings, as well as results of tests of yarn and fabric properties, and because of the interest of the Technical Advisory Committee in exploring the effect of various mill processing conditions on the quality of products manufactured from the test cottons, a project was initiated for this purpose.

Through the assistance of Mr. John T. Wigington, Director of the Technical Service Division of the American Cotton Manufacturers Institute, and representatives of the 17 mills involved in the test, the Institute was able to obtain rather complete information on the organizations used by the participating mills as well as other pertinent data. Results of the study indicated that some possible correlations between manufacturing variables and product quality existed. These correlations are discussed in this report.

The report has been subdivided into three parts. Part I is concerned with a description of the cottons used in the test and details of the organizations used by the 17 mills which processed the cottons. Part II attempts to correlate manufacturing variables with yarn uniformity and yarn and fabric strength. Part III consists of a discussion of possible relationships between processing conditions and neps in card web, yarn and fabric.

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STUDENTS

(Continued from page 2)

and Anthony G. Whittaker, Colne, Lancashire, England.

Second-year students include: Richard P. Barber, Taunton, Mass.; Earl J. Nickerson, and James W. Whitworth, Chelmsford, Mass.; Arthur J. Pendleton, Harrisville, R. I..; Robert G. Seid, Greenville, Miss.; Albin F. Turbak, New Bedford, Mass.; and Theodore Williamson, Jr.; Somerset, Mass. (*Daily News Record*, September 16, 1952.)

Technical Highlights of the Mon

SPINNING FRAME MAKES YARN FROM SLIVER

A new German-made spinning frame for cotton and other staple fibers up to 40 mm in length spins yarn from sliver in one operation. Drafts of as much as 100 are obtainable, it is claimed. Sliver cans are placed underneath the frame and sliver is fed directly into the five-roll drafting mechanism.

Conventional spindle drive has been replaced by a tangential continuous belt drive, positive drive can be supplied if preferred.

Since creels for roving bobbins are not required, operatives can more easily observe operation of the frame. Front to back width of frame is only 31.5". Blowers provided are reported to make frame practically dust and lint-free.

Other advantages cited by the manufacturer include: quality of yarn is as good or better than that made on conventional frames, increased production, an operative can tend more frames of this type.

Josef Pfenningsberg & Co., M. Gladbach (Rhld.), Siemenstrasse 20, Germany. (*Textile Industries*, September, 1952.)

ACS TOLD OF DYES TO MAKE TEXTILES WATER REPELLENT

Double-duty dyes that make fabrics water-repellent as well as colorful have been developed as the result of an accident five years ago in a chemical engineering laboratory, Dr. Clyde C. DeWitt, director of the engineering experiment station at Michigan State College, told the American Chemical Society as it opened its 122nd national meeting here today in convention hall.

The new dyes increase the water-repellency of wool 60 times without any change in the texture or composition of the materials, Dr. DeWitt declared. The dyes also should make clothes and other wool or cotton articles more durable, since they lubricate the materials and keep moisture out, Dr. DeWitt said, forecasting possible immediate application of the dyes in awnings, tents, and umbrellas.

Back in 1947, when the speaker and one of his graduate students were working on the refining of copper ore by a flotation process it was necessary for them to develop a special dye which had some of the properties of mineral oil, Dr. DeWitt said.

Some of this dye which had been spilled on the laboratory floor was mopped up with a white cloth. And when the same cloth, now colored spots, was used later to clean up some water, the chemical engineers discovered that the dyed portions of the cloth resisted wetting. The water-repellent qualities of the mineral oil had been incorporated into the dye.

A whole series of experiments on the dyeing of cotton and wool was carried out, and the research to date has succeeded in increasing the repellency of cotton by 12 times and that of wool by 60 times. The new dye-making process was described in a report to the society's Division of Industrial and Engineering Chemistry by Dr. DeWitt and another of his graduate students, Dr. P. D. Shroff, who is now a research engineer with the General Electric Co., Pittsfield, Mass.

This is believed to be the first time that high water-repellent qualities have been imparted to natural fibers such as wool and cotton by means of dyes, Dr. DeWitt asserted. Other methods now in use waterproof the materials after they have been dyed.

One of the greatest advantages of the new dyes is their permanecy, Dr. DeWitt said, adding that the water-repellent qualities will remain in the material as long as the dye. This is a definite improvement over most of the current waterproofing agents, which have to be re-applied each time the fabric is cleaned, he pointed out.

It may be necessary, Dr. DeWitt added, to modify the composition of present dry cleaning materials in order to satisfactorily clean fabrics colored by these dyes. (*Daily News Record*, September 16, 1952.)

THE GAFFNEY MANUFACTURING CO., GAFFNEY, SOUTH CAROLINA

Sixty years ago, the citizens of Gaffney and Cherokee County were both pleased and excited on learning that their town and country were going to have a new textile plant. This news was naturally a source of gratification to them, because during this period the growth of the Southern industry was just in the initial stages, and the town with a brand-new mill was looked upon with some degree of envy by their less fortunate neighbors.

In those distant days, the design and construction of a new mill were a much bigger undertaking, comparatively speaking, than they are today. The specialists and engineers who are now available for the solution of the many technological problems were unheard of in that era;

much, therefore, depended upon the ingenuity, forehanded courage, and common sense of the local folks, who were called upon to back their faith in the town and people with the required capital and essential "know how." It was in 1892 that the Gaffney Manufacturing Company was organized under these conditions. The original capital ventured was all local in origin; $50,000.00 being allocated for the initial operations, the balance of the capital, up to $100,000.00, being used to get the mills erected.

The founders of Gaffney really started from the very bottom; the brick used in construction was burnt on the grounds; the mill built by local people, and the working force recruited in the town and country.

Thus began the monument to the courage and foresight of the local people—the impressive and well-founded Gaffney Manufacturing Company as we know it.

The first mill, the original Mill No. 1, was built in 1892, and full-scale operations began the next year. The initial unit was both a financial success and a source of satisfaction to employees and stockholders.

Soon after the completion of Mill No. 1, the construction of Mill No. 2 was undertaken by the same group of stockholders. This mill was started in production in 1896. Only six years later the directors authorized the construction of a dyeing, bleaching, and finishing plant. This new unit, called Mill No. 3, was built in 1903.

An interesting comment on the textile market at that time may be taken from the Annual Stockholders' Meeting which was held July 28, 1898:

"**The quality of our production** still holds its own in the markets of the East, and while we get the top price, the prices of all cotton goods have in the past six months been lower than ever before, we keep our product sold up and have very few goods on hand. Cloth that we sold four years ago at 21½¢ net, per lb., we now sell for 13¢, a difference of 8½¢ per lb. During the year we have taken out our 300 common looms and replaced them with the Draper automatic loom which has reduced the cost of weaving in this room a little more than one cent per lb. This and other reductions in cost of manufacturing makes a comparison with one year of interest. In July 1897, the total cost of manufacturing was 15.61¢ per lb. and in the inside of the mill 3.12¢ per lb. In July 1898, the total was 12.58 and the inside 2.64, making a difference in saving of 2.72 on the total and .48¢ on the inside. Our spindles have earned $126,709.29 and after charging off all office expenses, interest, taxes, insurance, and commissions our net earnings are $62,010, 12% on our investment.

In 1906 Mr. G. H. Milliken was elected a director of the Gaffney Manufacturing Company, and it was about this time that Deering Miliken Company first held the Gaffney account. In 1912 Mr. Alfred Moore was elected President and held his position until 1925, at which time Mr. G. H. Milliken became President, with Mr. Moore acting as Treasurer.

In 1944 Mr. J. J. Norton, Jr., became Secretary and Assistant Treasurer and Manager. At the present time the officers of the Gaffney Manufacturing Company are Mr. Roger Milliken, President; Mr. J. J. Norton, Jr., Secretary, Treasurer, and General Manager, while the directors of the company are: Mr. C. L. Chandler, Mr. H. A. Hatch, Mr. F. G. Kingsley, Mr. G. H. Milliken, Mr. Roger Milliken, Mr. J. J. Norton, Jr., and Mr. W. A. L. Sibley.

In 1927 the original Mill No. 1 was completely torn down and was replaced by a new building equipped with modern machinery. At the present time the mill operates over 64,000 spindles, together with the necessary preparatory equipment.

The continued success of the Gaffney Manufacturing Company is due to the progressive and realistic management. Indicative of this attitude is the fact that the officers of Gaffney realize that, in order to remain competitive, full advantage must be taken of the economic potentials of new machinery design. Whenever surveys indicate that there is justification for the expenditure of large sums of capital, then the attitude of the Gaffney Manufacturing Company has been to use its capital to advantage. The recent installation of new roving frames, together with newly installed Saco-Lowell opening, picking, and drawing, makes this card room one of the most modern in the country. A large portion of the spinning is now equipped with anti-friction bearing spindles, while the whole mill is organized upon the complete use of long draft for roving and spinning. All of the spooling and warping equipment is of the very latest and most modern type, having been installed during the past three years. The slashers are equipped with moisture controls to insure uniform warps. The entire 1432 looms are equipped with Stafford thread cutters and feelers. In 1948 flourescent lights were installed throughout the mill so that today Gaffney enjoys the reputation of being one of the best-lighted mills in the industry. In the the drive for efficiency and economy, practically all of the overhead shafting has been removed and replaced by individual motor drives wherever advantageous. Re-

cently a large portion of the mill was refurnished with new hardwood floors.

Gaffney is one of the few older spinning mills in South Carolina which has been completely air conditioned. On June 25, 1950, air conditioning for the entire plant was turned on from ten central stations. Then, on August 1, 1951, the installation of mechanical refrigeration was completed with a capacity of 1100 tons of refrigeration every twenty-four hours. The air conditioning required the building of four apparatus towers, two being five stories high and two being three stories, and the bricking and insulating of most of the windows. By installing air-conditioning equipment, the mill has precise control of temperatures and humidity and is now able to maintain constant atmospheric conditions. The management feels that this close control has enabled them to gain more uniformity in the spinning of yarn and the weaving of cloth and has made more comfortable and desirable operating conditions for those working in the plant.

Being one of the most modern equipped mills in the industry and, at the same time having employees who have been with the company so many years, it is interesting to have these men recall conditions when Gaffney was in its infancy. In particular, Mr. Guilford S. Melton, now retired after 54 years of service, can recall when a spinner took care of four sides, but made less than five cents an hour, while a tender was assigned one fly frame or two at the most, and made little more than the the spinner. In those days the work day was from 6:00 in the morning until 6:00 in the evening. Mr. John Camp, now having over 45 years of service, recalls when each plant had its own wood-burning boiler generating steam for a Corliss engine which delivered power through a series of head shafts and belts to the main line shafting on the different floors throughout the mill. This turned a main wheel which drove four belts powering the line shafting all over the mill. Mr. Camp recalls that if a bearing burned out on the line shafting, the whole mill had to stop. These men are still amazed at the changes which have taken place in their chosen industry during the span of their lives.

The company is rightly proud of its long-time employees and honors them annually in a service banquet. This year at its annual service banquet there were seven veterans with service ranging from 30 years to 50 years, and 18 employees of 25 years continuous service. As a matter of interest, these people have an aggregate of 725 years of working time dedicated to the Gaffney Manufacturing Company.

The Gaffney Manufacturing Company is one of the large producers of wide print cloths and broadcloths. The high quality of its fabrics, as indicated by a very low percentage of seconds, and a continued high sale peak, is maintained by constant testing of stock at every stage of manufacturing and by following a course of systematic inspection and overhaul of all machinery. One of the big factors in producing yarn free from slubs, and fabric clear of imperfections is a rigorous cleaning schedules.

In this modern age successful manufacturing operations are becoming more and more dependent upon a complete mutual understanding among the entire operating staff. Even the casual visitor to Gaffney must be impressed by the spirit of good will and mutual respect which prevails throughout the plant. The teamwork based on such a condition is one of the big factors in the current success of Gaffney. With both management and operators cooperating to produce only high-quality fabrics, and with the proper equipment available, this mill promises to hold secure its present strong position in its field. (*Saco-Lowell Bulletin,* June 1952.)

COTTON SYSTEMS ADJUSTMENTS MADE IN PROCESSING ACRILAN

On the cotton system, it is necessary to make some adjustments to accommodate the "bulk" property of Acrilan, it was stated by Graeme Whytlaw, Assistant director, Textile Research Department, American Viscose Corp., at a meeting of the American Association of Textile Technologists last night. Mr. Whytlaw spoke on The Processing of Acrilan Acrylic Fiber.

The staple opens readily and all cotton type beaters, openers and cleaners should be avoided, the speaker said. "A standard hopper feeder is all that is required. Either one or two process pickers may be used and here, because of the bulk, the weight of stock should be reduced at each beater section feed in order not to overload the picker cages. Where a picker has a blending reserve box, the finisher section draft should be reduced one-third. The picker lap length should also be reduced approximately one-third.

"In carding, we recommend a licker-in with No. 1 rayon type wire and a stripping cycle of about every four hours to produce a clear web. We do not suggest the use of a continuous stripper or fancy. Again, due to its bulk, we believe a 45 to 50 grain sliver is best, at a card production of 10 to 12 pounds per hour. If a heavier sliver is made, difficulty will be had in passing it through the coiler tube gear," he said.

At drawing, the sliver weight should be down to 50 grains in order not to have similar trouble. Standard drafts, settings and rolls speeds such as are common for rayon are quite satisfactory. In roving, the lay should be increased and tension adjusted here again because of the bulky nature of Acrilan acrylic fiber. In spinning, a twist multible of 3.50 has given the best spinning and strength properties.

"On the worsted system," Mr. Whytlaw said, "stock can be fed directly to the Bramwell feed without previous picking and no oil or emulsion or water should be added. Carding production is normal with 2 ounces per yard delivery and a heavier end is not recommended due to the bulk of the fiber. In subsequent operation of gilling prior to combing, delivered weights are approximately two-thirds that of regular viscose staple. The weight per end feed in the Noble comb is best at approximately 4.5 ounces per 5 yards. Coarse pinning on the comb will adequately remove short fibers and neps.

"Viscose rayon of the same denier and length will require a higher number of pins per inch to produce a sliver of similiar perfection. Again, due to bulk, the production of the Noble comb is reduced to approximately one-half that obtained with a similar denier and length viscose staple, or more nearly that of wool. However, in the finishing operations after combing to produce top a 3-ounce end is made which is normal machine production. Finished top balls range in the neighborhood of 8 pounds as compared to 10-pound regular rayon top.

"In the drawing and spinning operations, Acrilan production is equal to that of good wool and no significant machine changes are necessary other than those normally used to set up for a given denier and length. Going back to carding, we emphasize that no oil or emulsion should be added to the finish now supplied on the yarn by Chemstrand. If the fiber, however, is stock dyed, it will probably be necessary to pick it up before carding and since the dyeing of the fiber has removed most of original finish, it must be replaced. Here we recommend spraying the dyed stock on the picker with 0.6 per cent of "Avcosol" No. 104 in a 10 per cent emulsion," the group was told.

"On the woolen system, no changes in card settings over those used for a similar denier and length of viscose staple are necessary and stock may be fed directly to the breaker card without picking. In the case of stock dyed Acrilan, we recommend the same procedure as to picking and application of "Avcosol" No. 104 as we did under worsted processing.

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"We think we can say with justification that Acrilan now produced is so consistent that it outdoes the natural fibers as far as adjustments necessary to compensate for different shipments are concerned. In fact, a worsted spinner has said "it runs better than wool."

"We still have an unsolved problem in weaving, namely, that of satisfactory size for a 100 per cent Acrilan warp and here we are not alone, for all hydrophobic fibers have this same difficulty. We can safely say that we have tried over 400 size formulations with varying success. Recently the most promising is the use of Acrysol No. 3 manufactured by Haas-Miller with a softener-lubricant added. With this we are not entirely satisfied, but acceptable weaving has been possible. We are optimistic that the joint efforts of the size manufacturers, ourselves and our customers will soon result in a size formula easy of application, satisfactory in weaving efficiency and readily removed in the dyeing operation.

"In blends of 50 per cent or less of Acrilan we suggest the standard size formula generally used for the other components in the yarn. Approximately a 10 per cent increase in size content, however, will assure better protection for the warp ends. Of course, two-ply warps of 100 per cent Acrilan yarns need not be sized to insure good weaving," he indicated.

The fiber can be dyed with acid dyes, chrome dyes, acetate dyes, some azoic dyes and some vat dyes. At the present date, only the first four classes of dyes mentioned have been subject to much investigation, Mr. Whytlaw declared. (*Daily News Record*, September 11, 1952).

HOW TO GET SQUARE CLOTH IN WET PROCESSING

The wet processing of finishing of woven goods with checked patterns in them has been a problem with the finisher for a long time. It is his job to process the goods through several machines and prevent bowing and skewing of the fabric, a condition which is easily noticeable on checks and other filling-wise patterns.

The finisher must also remove as much of the natural bow in the fabric as possible. Thus, as he processes the goods, the finisher is at the same time attempting to correct certain natural results of the weaving process (bow) and trying to prevent defects which can easily be made in his own plant (both bow and skew).

The problem of the finisher was greatly magnified when the designers and weavers began making checked fabrics on dobby looms without multiple boxes. This is accomplished by inserting various widths of filling at specified intervals which we call "beat-up-filling" satin stripes. The use of this system in weaving enables a mill which probably had only a few box looms and many dobby looms to increase its production of checked fabrics.

Although this discussion primarily concerns checked fabrics, the principles of correcting skew and bow apply equally to plain goods; however, the defective work is more pronounced on checked goods.

Even if the skew and bow show up in the goods after they are finished, the defective work is costly, but not disastrous—for they can be reprocessed and the necessary correction made the next time through the plant.

The very first item in preventing skew is to have the goods sewn straight in the grey room, before starting through the finishing process. Almost always it is necessary to tear the ends of each piece to be sewn along the filling before sewing; this gives a straight seam, except for the bow in the cloth.

Even after tearing the cloth filling-wise, sewing can cause trouble unless the sewing machine operator keeps the cloth straight and sews along the line of the filling. A crooked sewing job at this point takes the entire piece through processing in a crooked manner.

The simplest means of keeping the weft straight is not to let it get crooked. This may seem a facetious statement, but it definitely is not. All the machines through which the cloth passes must be observed, and any machine that is causing the filling to become crooked must be adjusted.

When the correction is made early in the processing, the final straightening by the finisher at his tenter frame and in the sanforized process is reduced.

We have found that our main sources of trouble are the expander rolls (curved rubber type) wherever they are used and the mercerizer tenter frames. The mercerizer tenter frame is likely to cause the most difficulty when one side of the chain is worn a greater amount than the other; the chains will travel at different speeds, thus causing one edge of the cloth to travel faster or slower than the other, thereby giving a definite skew to the fabric.

The only means of correcting this defective work at this point is to replace the tenter chain at such times as the wear on each side is uneven. So long as each side of the chain wears uniformly, the skew should not be serious.

The expander rolls must always be kept in first class condition or replaced when they become

worn. These rolls can develop swells and dents for short distances, and the rolls also vary in diameter as they become worn. Such a condition causes uneven bows or skewed places for short distances in the cloth—more probably bows than skews.

While passing through the expanders, the goods must be observed. Although definite patterns of defective work are not always made at this point, it is a simple matter to observe the expander rolls while in operation and to determine whether or not damage is caused by them.

Should the expanders be causing crooked cloth and still are not worn or out of line, it is possible to eliminate the trouble on that particular fabric by skipping the expanders entirely or by changing their pitch.

Less damage or change in the cloth occurs when the cloth and the expander are in the same plane. The bow is more pronounced if the expander is turned up or down away from the plane of the cloth.

Even though goods reach the finisher with filling that is not squared, his problem is still not too great if the defect is uniform—that is, if it is in the same direction. The greatest difficulty is experienced when the filling of the cloth skews in one direction temporarily and after a few yards changes to the opposite directon.

Very often we have bow and skew at the same time. The principle of correction is actually very simple, but execution of correction is not so easy because it requires close attention on the part of the operator and the supervisor.

The bow is removed by running the cloth over a pair of bowed rolls or bars which can be adjusted to do the job. The skew is removed by causing one edge of the cloth to travel a greater distance than the other edge—until the cloth is straight—and then to have both selvages travel at the same speed to remain straight. This is where close operator attention and close supervision are necessary.

When removing skew, pass the cloth over a straight roll or bar which can be pivoted or tilted. Such devices are often controlled automatically, but in some instances can be controlled manually. Manual operation naturally requires closer observation on the part of the operator, depending on the condition of the fabric, degree of skew, etc.

Manual control obviously is the more expensive method because of the labor cost involved.

The big difficulty in either case is that the filling must be seen while the cloth is traveling at production speeds; this is easy on some fabrics, but on others the machine speed must be reduced.

Although automatic devices are helpful in preventing skew, the fabric should be observed just in case the equipment is not operating properly. Also, the cloth must be watched at the beginning of a run or when processing a different construction because automatic devices for straightening have to be adjusted for each different construction.

At our plant we have automatic devices on the tenter frame where we attempt to straighten the cloth, and then in the sanforized process we have additional devices where the final correction is accomplished—the latter are manually operated.

Even with all the modern electrical gadgets for straightening fabric end with operators paying close attention to manually operated equipment, it is quite probable that some goods will get by that are not perfectly square—thereby requiring some reprocessing. (*Textile Industries*, September, 1952.)

"STRETCH" NYLON TO BE SEEN SOON IN WOVEN GOODS

Woven fabrics of "stretch" nylon yarn are being made and makers of several types of gar-

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ments are said to plan their introduction soon, according to Duplan Corp. These fabrics are said to have controlled one or two-way stretch.

The nylon yarns are made by the new Helanco patented method, developed in Switzerland, which Duplan Corp. has been licensed to use in the United States, as noted. These fabrics for the women's wear field include sheer types woven in pucker form which can be stretched, so it is easy to put on or take off garments.

The process used by Duplan includes twisting and heat setting, and requires many operations, increasing the price of the yarn by about 150 per cent, it is stated.

The process and name are protected by United States and foreign patents. The finished yarn is always two-ply. The yarn has been used in men's hose and in gloves and has been processed by the firm on a commission basis. Smallest size yarn used in this process is 20 denier, making a total of 40 denier in the final plied yarn (*Daily News Record,* September 15, 1952.)

SPIRAL PLATE HEAT EXCHANGERS

The Rosenblad spiral plate heat exchanger, which originated in Sweden, is well known in many parts of the world for its varied interesting applications. Though only recently manufactured in the United Kingdom, Rosenblad equipment is now in use by many British industries, among them: textile, aluminum, chemical, electrical, gas, iron and steel, oil and fat, paper, pharmaceutical, photographic, plastics, and sewage treatment.

The exchanger basically consists of two plates of calculated length which are rolled together on a special machine to form two concentric spirals (rather resembling a "Swiss roll"). The three main factors enabling a wide selection of operating conditions to be met are (a) plate length, (b) plate width, and (c) the distance by which the plates are separated. It is obvious that varying conditions requiring different pressure drops, volumes of liquid and heat transfer rates, etc., can be achieved by scientific choice of these factors.

Indeed, when it is realized that a single unit with a heating surface area of over 2,200 sq. ft. can be built, the immense variety of applications can be appreciated. The makers point out that compact design enables 2,200 sq. ft. heating surface area to be contained in a unit measuring 5 ft. in height by 6 ft. in dia., also that it is possible to transfer heat of the order of 100-120 million B. Th. U. per hour with such units.

Possibility of the two media mixing in the exchanger is claimed to be eliminated by welding in a strip of suitable material at one side of each passage normally the welds are on opposite sides but if a particularly difficult liquor is to be handled, then one passage can be sealed on both sides, leaving the other passage open at both sides.

Cleaning is preferably by the circulation of a suitable solvent, the design of the units being such that the solvent reaches the entire heating surface area without the risk of any dirty "pockets." If frequent need for cleaning is foreseen, the covers can be hinged, but it is stated that the smooth continuity of flow in the spiral passages minimizes scale formation; it is reported, in fact, that when a British engineer recently visited Sweden to examine a wide variety of installations, he found that of the 50-70 heat exchangers seen, many had been in operation for years without any cleaning at all. One of the foremost advantages claimed for the design is the absence of dead spaces which reduce heat transfer efficiency, another is that absence of baffles and sudden changes of direction ensure constant velocities and eliminate local hot spots.

The spiral plate heat exchanger is often used as a condenser, and in these cases it is mounted with the central axis in a vertical position so that the condensate flows down the plate and is then carried round to drain at the end of the spiral (i.e., steam spiral towards its periphery). Variations of design enable pressure drops to be kept down in some cases to about 1 in w. g.

Although manufacture is at present confined to mild steel , stainless steels and monel metal, the use of other materials is by no means excluded, and the British manufacturers—Ashmore, Benson, Pease & Co., Stockton-on-Tees, are in fact, at present co-operating with European and American associates in the development of suitable manufacturing technique for new materials. (*Textile Manufacturer,* August, 1952.)

THE NEW ERA FILLING SPINDLE

In 1948 we announced the revolutionary Saco-Lowell New Era Spindle for warp spinning. This spinning spindle won immediate acceptance both in this country and abroad because of its many inherent advantages. The success of this spindle encouraged us to develop a similar spindle to meet a definite need in the field of twisting. A year later, we were able to install twisters with New Era Spindles which were capable of meeting the wide range of operating conditions and extreme demands imposed by twisting. With these modern spindles in practical use for warp spinning

and twisting, our next objective was to develop a New Era Spindle for filling frames.

The New Era Spindle for warp spinning marked a definite departure from the conventional type of spindle because the central shaft is stationary, securely fastened to the spindle rail by a simple but effective anchorage which dampens out vibrations, and also incorporates a device which makes plumbing a very simple and easily accomplished operation. The tube which carries the package is supported on the central shaft by two ball bearings of special design which do not require lubrication more often than every five years. The distinguishing feature of the New Era Spindle is the support of the load between two bearings, which effects a vast improvement in the running characteristics.

From the numerous tests which we have made since its introduction, we have found that there is a very definite power savings which sometimes is as high as 30% when compared to conventional spindles. Furthermore, frequent lubrication is eliminated; and since grease is used rather than oil, the spindle rail is always clean, the conventional 80-hour spindle lubricating routine is not necessary, and this source of oil stain on the yarn or seepage onto the tapes is eliminated. The New Era Spindle for twisters is constructed following the basic designs of the spinning spindle. These spindles have shown an unusual mechanical stability which permits the use of high speeds with heavy packages.

Our tests have shown that the New Era Spindles for twisters have at least twice the load-carrying ability of their conventional counterparts. This twister is built in three sizes, the smaller of which is designed to carry a 2-lb. package at 9000 R. P. M. maximum, a medium spindle will carry a 6-lb. package at 8000 R. P. M., while the heavy spindle will carry a 12-lb. package at 5000 R. P. M. maximum.

In developing a spindle of the New Era type of filling frames, there had to be a definite departure from the previous New Era Spindle design. The filling bobbin imposes important restrictions upon the construction of a spindle because, as the bobbin has to fit into the loom shuttle, it must necessarily remain of small diameter. Therefore, the New Era Spindle for filling had to be designed to carry a bobbin having a small bore. It was not

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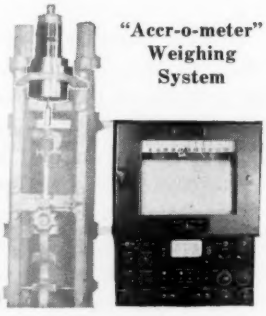

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possible to adhere to the New Era principle of supporting the sleeve which carries the package between two anti-friction bearings, as the bearings which would fit into such a restricted space at the top of the spindle would be so small that they would not be able to maintain the high speeds and relatively heavy loads imposed by spinning. However, we have now been able to overcome these obstacles and now have proved that the Saco-Lowell New Era Filling Spindle is practical and successful, as we have had several installations in trial operation for several years.

In this spindle the conventional New Era type of rubber mounting is used, employing rubber washers which reduce vibration and, of course, with the construction which permits the simplified New Era method of spindle plumbing. The only change in this spindle over that of other New Era Spindles is that the main shaft is shorter and mounts two anti-friction bearings. The top bearing is located near the shoulder above the top flange of the whorl, and the bottom bearing is located just inside the lower end, just about the center of the tape pull. While this distance is relatively short compared to the wide spacing between bearings on the warp and twister New Era Spindles, we have found it to be entirely adequate for the comparative lighter loads of filling spinning.

The New Era Filling Spindle, completing our "family" of this advanced design of spindles, has all the advantages inherent in this new design. The spindle will show a definite power savings, eliminate the usual oiling routine, and prevent oil staining the yarn. We feel sure you will want to take advantage of this New Era Spindle as you have taken advantage of its predecessors. (*Saco-Lowell Bulletin,* June, 1952.)

ROTH SINGLE-BELT UNIT CAN NOW BE CONVERTED TO DOUBLE-BELT DRAFTING SYSTEM

Increased fiber control and higher drafts are principal advantages to be derived from the new Saco-Lowell Duo-Roth drafting element which, the manufacturer reports, can be easily and quickly applied to existing Roth drafting units at a minimum expense and with a minimum amount of frame stoppage.

The Duo-Roth changeover, when applied to a standard Roth drafting element, converts the Roth single-belt into a double-belt drafting system, with the top belt or apron replacing the standard Roth middle top roll and control roll. The changeover consists of a Torrington needle-bearing middle top roll, two cages, two top synthetic aprons, two bottom synthetic aprons, a condenser assembley, and a hold-down spring for the cages. These parts will equip two spindles.

Other advantages claimed for the Duo-Roth system are: (1) It is readily accessible for cleaning and very flexible in its ability to handle the entire range of long and short staple cotton fibers; (2) a tight bottom apron is maintained; (3) fly or lint on the inside of the bottom apron can be easily removed because of the apron's long length and more open position.

To take advantage of the greater drafting capacity of the Duo-Roth and to allow the use of a variable break draft, the manufacturer recommends that frames be equipped with new Shaw draft gearing.

Saco-Lowell Shops, 60 Batterymarch St., Boston, Mass. (*Textile Industries,* September, 1952.)

GERMAN KNOT-TIER WITH FOUR UNITS SAID TO BE VERSATILE

Four interchangeable units in a single knot-tying machine brought out by Knotex Maschinenbau, Gmbh, have given the apparatus a range from 25-denier pure silk to 20/2 linen or even coarser threads, and a speed that varies according to the thickness of the yarn up to 400 knots a minute, the firm says.

The units can be shifted quickly and set themselves automatically according to the threads to be tied. The machine will tie both warp-threads from the clip, both warp-threads from the lease 1:1, the old warpthread from the lease 1:1 and the new warpthread from the clip, or the old warpthread from the clip and the new warpthread from the lease 1:1.

The Knotex will tie pure silk, rayon, nylon or Perlon, wool worsted yarn, condensed yarn, cotton, staple fiber, linen or other threads, the firm said. It ties the whole width of the warp in a single automatic process.

The construction of the tying frame is such that it permits the tying to be done at the back of the loom, even where lack of space is a handicap and where the use of other frame constructions is impossible, according to the manufacturer.

The new Knotex is driven by a built-in AC-DC motor. The tying apparatus itself is almost completely enclosed to make it "perfectly dustproof," the firm says. Further, a built-in ventilator produces a constant stream of air during the tying process, which prevents the accumulation of lint.

The ends of the knots are no longer than a quarter-inch to insure quick and unhampered

passing through detector, harness and reed. This advantage is especially effective with hard-twisted yarn, crepe and so on, as it prevents the ends of the knots from getting tangled, the firm pointed out.

The apparatus weighs about 30 pounds and can be easily carried in its box, or the box can be attached to the tying frame, which is mounted on wheels.

Vertical and horizontal movability of the tying frame makes it easy to adapt the machine to prevailing conditions at the loom or in stationary position, even where want of space is a hindrance.

Preparation time to put the machine in operation is said to be very short and cleaning extremely simple. The tying frame is available in standard widths ranging from 47¾ inches to 88⅞ inches, or in other widths if desired.

The outfit was quoted at about $4,230 f. o. b. Hamburg for export, with deliveries "within a short time." American firms have found earlier models satisfactory, a company spokesman said. (*Daily News Record,* September 8, 1952.)

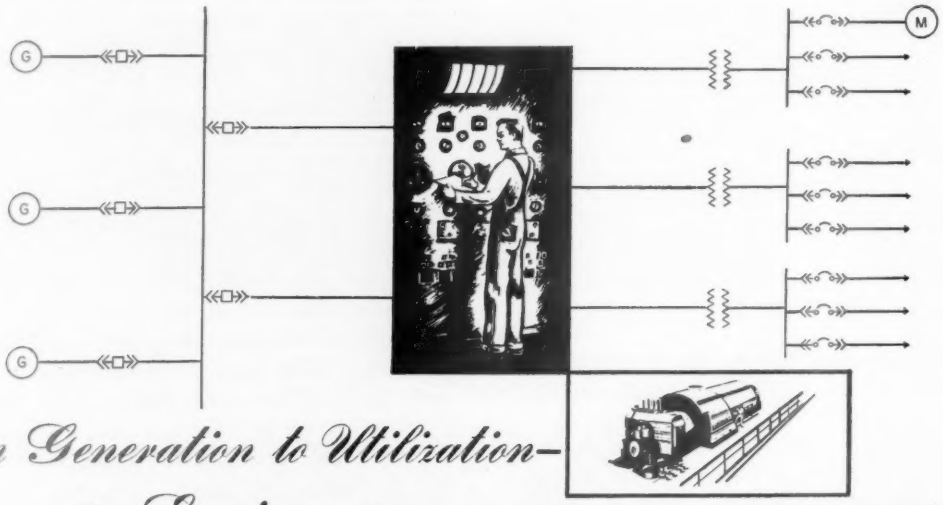
BLENDS OF ACETATE STAPLE AND OTHER FIBERS

The growth in production of acetate rayon staple has been due principally to its use as a component in blended yarns. The special properties of acetate staple are complementary to those found in other rayon and natural fibers, and in many cases provide special features. Acetate fiber in particular gives such desirable properties as attractive handle and draping, dimensional stability, ease of laundering and recovery from creasing.

This paper describes blending techniques at present being used on the cotton, worsted and woolen systems.

Blended yarns composed of acetate and viscose staple spun on the cotton system have accounted for most of the acetate staple produced. A large proportion of the fabrics made from blends of these fibers is piece-dyed usually leaving the acetate reserved. Such qualities particularly as in rayon suitings demand the greatest accuracy in blending. Three main considerations necessary in order to achieve a satisfactory end result are: (1) simplicity of production, (2) intimacy of blend, (3) accuracy of composition.

The most satisfactory method is to blend at the opening stage; this fulfills the first two conditions. The method being simple, any percentage



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blend can be achieved, and an intimacy of blend is assured at carding.

Blending at the draw frame appears to offer attractive possibilities for mixtures of simple proportions but trials have shown, however, that the intimacy of the blend is not so good as that obtained by blending in the blowing room.

Most spinners require the material in a tinted form, but there is a growing practice for the spinner to apply his own tint, as is the usual practice in the U. S. A. The tint is usually applied by an atomised spray unit placed near the opening line; the best position for the spray is in the last hopper feeder in the line. The unit should be so designed that it stops and starts automatically in conjunction with the hopper feeder.

The dyestuff powder is made up in an aqueous solution and trial should be made with various concentrations of tint. It should be noted, however, that as light a color as is commensurate with good sighting properties should be aimed at. A tint application to the extent of 001 to 004% calculated on weight of fiber gives satisfactory results.

No modification in the production of acetate blend yarns is necessary to the standard practice in the operations subsequent to drawing. Some experimental work has been carried out with nylon and Ardil in blends with acetate staple and the yarn characteristics which are given are obtained from yarns produced with normal blending methods.

Acetate/Cotton Blends. As acetate staple does not require the cleaning required by most varieties of cotton the blend is usually made by first subjecting the cotton to opening and cleaning treatments. The two fibers are then processed on the standard single line opening process used for all rayon qualities. Alternatively blending may be carried out at the finisher scutcher or at the draw frame. The important point is, that the acetate fiber should not be unnecessarily subjected to the harsh beating treatment necessary for cotton cleaning.

Acetate/Wool Blends. Increasing interest is being shown in the possibilities of utilizing the cotton system for mixing wool and acetate fibers. Two methods of blending are used, and the type adopted depends upon the quality of the wool used and the degree of intimacy required in the blend. The methods are as follows:

(1) The wool is obtained in top form and cut to the staple length of the acetate fiber. Blending is then carried out in the blowing room in the normal manner. By this method a wide variety of wool qualities may be used and satisfactory results are obtained in spite of the introduction of some quantities of short wool fiber produced by the cutting process.

(2) Short staple wool qualities, where the staple length is of the order of 2 to 2½ in. are employed. Combed top of this quality is drawn to the weight of a card sliver and blended with acetate staple of similar staple length at the draw frame. By this method the short fibers introduced by the first method are avoided but some intimacy of blending is sacrificed as the two components are carded together.

Slub Yarns. Mixing fibers of widely different staple lengths opens up interesting possibilities. For example: A slub effect may be produced by the use of 20% ½ in. acetate staple in a mixture with 1 7/16 in. staple of either acetate staple or another fiber. Use of short staple acetate for producing slub effects with fibers having different dyeing properties makes possible the dyeing of the slub a different color from the body of the yarn.

The slub which is composed of the ½ in. fiber is produced by differential drafting. The technique usually employed is to produce a card sliver from the ½ in. staple fiber and the sliver of this is drawn with the sliver of normal staple length at the last head of the draw frame. It will be noted that an intimate mixture of the different staple lengths has been deliberately avoided. If an intimate blend is made then the slub effect is to some extent mitigated.

Worsted System. The application of acetate staple on this system of spinning has been mainly used for the production of acetate/wool blends. The quality of acetate employed is usually 4.5 filament denier, in staple lengths of 2½ in., 4 in. and 5 in. Typical qualities of wool used are short cape varities, botanies and fine cross-breds. 4.5 denier appears to be a suitable quality for admixture with these wool qualities. (*Textile Manufacturer*, August, 1952.)

NEW ENGLISH INSTRUMENT MEASURES YARN VARIATIONS

A new instrument for recording the variations in diameter of spun yarns in the spinning frame has been developed by Dawe Instruments, Ltd., of Hanwell, London.

Made especially for the Linen Research Association, Belfast, Northern Ireland, the instrument, which has been called the "Linra" Photo-Electric Yarn Irregularity Gauge, can be used for any natural or synthetic staple spun yarn.

A photocell and amplifier circuit are used to

measure the diameter of yarns while spinning, or, if required, while being drawn past the photocell head by any unwinding mechanism.

The results are presented either as a continuous trace on a recording milliammeter, which immediately shows any periodic fluctuations, or, with the instrument damped, as two meter readings, one giving the mean diameter and the other the deviations from this mean, integrated continuously over a period of about five seconds.

The equipment is designed as a mobile unit, adjustable to operate on any standard spinning frame without damaging the yarn or interfering with production in any way, the efects of any adjustments to the frame being immediately available.

The equipment has two main applications: First, with the recording milliammeter, the chart speed is adjustable (1″ and 6″ per hour, or per minute) which reveals either long or short period variation in diameter.

By relating the period to the chart speed, spinning speed and drafts throughout the system, faults which are not normally obvious until the yarn is woven, may be located and rectified with the minimum delay.

Second, with the instrument damped and the integrating circuit in use, a rapid check on the yarn quality is available in the form of a coefficient of variation or irregularity index.

A large number of spinning spindles may be tested without any loss in production or yarn, so that sampling errors are minimized, and the usual delay between spinning and testing is eliminated. (*Daily News Record*, September 8, 1952.)

ANOTHER STEP TOWARD BETTER CARDING

The general construction of the standard revolving flat top card and roller top card has remained unchanged for many years. This has been due principally to the fact that the card, as now constructed, performs a very efficient operation of fiber separation, and does this at minimum expense and with very low required maintenance. However, while the general construction and the theory of operation of the card have remained unchanged, we have always redesigned such subassemblies wherever the need of an improvement has been indicated.

As an example of this, over twenty years ago, we brought forth the Saco-Lowell Continuous Stripper, and today, there are over 19,000 strippers now in successful operation. The stripper has proven to be of great practical value in reducing sliver unevenness resulting from frequent hand-stripping of the cylinder and, of course, reduced the necessary labor required to keep the cards in operation. Approximately ten years ago, we discarded the conventional grid bar cylinder in favor of our new waste control screen. This screen, made with perforations instead of bars and with its static controlling properties, has been instrumental in reducing card maintenance.

For the past three years, we have been supplying roller bearings for the lickerin as standard equipment on all new cards, and for application to cards already in the mill. The experience which we have gained since that time has shown us that the use of anti-friction bearings at this point has done much to reduce wear of the lickerin journals and to permit the maintenance of accurate settings of the lickerin.

We have now taken another step forward in improving the construction of our standard card by applying anti-friction bearings to the feed roll. We believe that this application will prove of real importance in improving the efficiency of the card, particularly, when regarded over a long period of time. The feed roll has always been supported by plain bearings. These bushings serve not only to support the feed roll, but also transmit the pressure from the feed roll weights onto the feed roll itself. This plain bearing is perfectly satisfactory as long as the bearings are not worn, for when the bearings are not worn, the feed roll is held down onto the plate and affords a secure grasp on the lap as it is fed forward to the lickerin. When the feed roll is properly held against the feed plate, the fringe of the lap is held securely, and the teeth of the lickerin comb the fringe, taking out very small groups of fibers.

However, when the feed roll bearings become worn, most of the effective pressure on the feed roll itself is lost. The bearings are still held down in place by the weight levers and weights, but the feed roll itself can move up and down to an extent governed by the amount of wear in the bearing. When this wear becomes excessive, the fringe of the lap is no longer held securely, and the teeth of the lickerin are able to pluck larger clumps of fibers from the lap and to pass them forward to the cylinder. Such clumps of fibers will not be properly carded, tend to become impacted on the wire of the lickerin and cylinder, and are apt to be either removed by the flats or to pass forward into the sliver. In any case, the net result is that the quality of the sliver suffers, and there is unnecessary waste made at the carding operation.

It has been the opinion of many engineers

that the feed roll was operated at such a slow speed that it was not necessary to apply anti-friction bearings. When it was seen that improved operating conditions could be obtained by using anti-friction bearings, and after sufficient trial installations had shown that the method of application which we intended was successful, this change in design was instituted and is now standard. Results of such trials have shown that the more even movement of the feed rool and the more effective pressure on the lap have resulted in a more continuous feed to the lickerin, which has resulted in the carding of more even sliver. The main advantage of anti-friction bearings on the feed roll is that wear cannot occur to cause a loose fit between the feed plate and the feed roll, and therefore, there is a secure grip on the lap at all times.

In the opinion of our engineers, the changes such as the bearings for the lickerin and the feed roll, have played an important part in improving carding efficiency. It is their belief that such changes are of utmost importance and that they believe the often heard statement that the cotton card has not improved in design for the last fifty years. (*Saco-Lowell Bulletin*, June, 1952.)

SOME SOUTHERN MILL PEOPLE HAVE A HERITAGE ALMOST A THOUSAND YEARS OLD

Visitors to the mountains of western North Carolina and eastern Tennessee have marveled that a people who lived in mountain coves in almost complete isolation for several generations, could emerge and so quickly become efficient operators of textile machinery and could evidence such an interest in education and in independence..

Some visitors to the textile miil villages, to which mountaineers have moved, are puzzled by the large number of children with blonde hair and blue eyes and wish to know their background.

The story goes back to the early years of the Eighth Century when the area which is now east Saxony and Bavaria was the largest center of textile manufacturing in the world. It consisted then of hand spinning and hand loom weaving.

About 800 A. D. a large number of the people of that section of Germany moved to England and, having driven the Celts out of the area which is now known as the Lancashire Section, established there the largest textile industry in the world, in fact, it is still the largest. They were known as Anglo-Saxons but could have well been called Anglo-Bavarians.

Some years later ability to secure wool in the lowlands of Scotland induced many to move from the Lancashire Section to that area and they built there the largest wool manufacturing industry in the world at that time. They did intermarry to a small extent with the highland Scots but largely retained their homogeniety.

A few years after 1600 A. D. James I, a King of England, desiring to settle a portion of Ireland with Protestants, induced some of those in the lowlands of Scotland to move to the Ulster section of Ireland.

One inducement was that there was a supply of wool in Ulster and the other was that the King pledged that there would be no excessive taxation.

Those who moved from the lowlands of Scotland to the north of Ireland built there a great wool manufacturing industry and also established the linen industry which exists in Ireland today. There they were textile manufacturers just as they had been in the lowlands of Scotland, in the Lancashire section of England and back in the Bavarian and east Saxony areas.

They were called Scotch-Irish because they had moved from Scotland to Ireland but they had little Scotch blood and because of the violent religous prejudices of that era they seldom intermarried with the Catholics of Ireland and had practically no Irish blood. They were, as they had always been—basically Bavarians.

When they became prosperous the Crown levied heavy taxes upon them in violation of promises made by James I, who was then deceased, and as was and is, characteristic of the race, they became greatly enraged because of the injustice and actually burned down some of their woolen mills.

In a period of four years, more than half of the so-called Scotch-Irish left northern Ireland for America. Most of them settled in Pennsylvania just below Philadelphia and there again built a large textile industry. In the years between 1710 and 1770 they were joined by other families from the Ulster section.

Later these people made their final migrations.

A small group moved to northern Michigan while a much larger group moved from lower Pennsylvania, through Virginia, and settled to a large extent between the Yadkin and Catawba rivers in North Carolina, but some went as far south as Spartanburg, South Carolina.

They probably thought that in the Piedmont section of North Carolina they had, at last, found a haven of political and religous freedom and that

they would not again be subject to unjust government or excessive taxation but they were soon disillusioned.

They met with all types of injustice—economic, social and religous. Those who tried to remedy these intolerable situations became known as Regulators. The Regulator movement was an effort to eliminate or to lessen the burdens of a government which was not responsive to popular sentiment, to overthrow corrupt officials, and to bring more honesty and efficiency into the operation of local affairs. Isolated and out of sympathy with the ruling classes in the east, the people of the back country were ripe for revolt.

But the Regulators were defeated in battle, and now they either had to submit or move west. Many of them sought refuge in the isolated coves in the mountains while at least 1,500 moved that year to Tennessee and Kentucky. Some 6,000 were pardoned.

During the Revolutionary War, those who had gone back into the mountains were joined by Tories who sought refuge in the isolation and around 1860 they were joined also by many who wished to avoid service in the Confederate Army, along with some deserters. There were no roads back into the mountains in those days and those who went were in almost complete isolation and were secure from outside contacts.

While many went far back into the mountains to avoid service in the Revolutionary and Confederate armies, many thousands of others came out of the mountains and were among the finest soldiers in both wars.

The Battle of Kings Mountain which was a turning point in the Revolutionary War was fought almost entirely by men from the mountains of western North Carolina and east Tennessee.

While North Carolina has always been overwhelmingly Democratic and very few counties east of the mountains ever vote other than Democratic, many of the mountain counties in western North Carolina and east Tennessee have been habitually Republican due largely to remembrances of earlier difference with the people of the east.

The curse of slavery, which made it easier to operate plantations in central and eastern North Carolina, delayed the development of the textile industry in North Carolina and South Carolina but with the end of the Civil War, the South began to build textile mills and there was a vast movement from the isolation of the mountain coves to the mill villages in the Piedmont section of North Carolina and the northwest portion of South Carolina. In order to provide homes for these people, the mills built villages and assisted in the establishment of churches and schools.

The ancestors of the mountain people had been textile manufacturers in east Saxony and Bavaria, the Lancashire section of England, the lowlands of Scotland, the north of Ireland, and in lower Pennsylvania and it was but natural that they should turn again to textile manufacturing.

The mountain people, with their heritage of textile manufacturing skill going all the way back to east Saxony and Bavaria, have been the real basis upon which has been developed the great textile industry in the South.

While the mountain people were first brought from their coves to textile mills in the Piedmont section, with the building of good roads into the mountains, textile plants, especially knitting mills, have been built in large numbers in the mountains. Some of the finest full-fashioned hosiery is now produced in mills in small towns in western North Carolina.

It can be truthfully said that nowhere in the United States can there be found a group of people whose blood and background is superior to that of the mountain people of western North Carolina and east Tennessee. For several generations many of them suffered from the isolation and the lack of churches and schools incident to the mountain coves and poor homes in which they lived but with the coming of good roads they have emerged and are rapidly proving their character and worth.

A few years ago a Harvard University professor, well versed in folklore, heard a woman in the mountains of east Tennessee singing a lullaby to her baby. He wrote down the words and found that, although somewhat garbled, it was a lullaby of ancient Bavaria. It had been handed down from mother to daughter as the race moved from Bavaria to the Lancashire section of England, to the lowlands of Scotland, to northern Ireland, to lower Pennsylvania, to the Piedmont section of North Carolina and finally into the isolation of the mountains of western North Carolina and Tennessee. David Clark, *Textile Bulletin 78*, page 134, 135, 136 (September, 1952).

QUALITY CONTROL AT AVONDALE MILLS

The purpose of quality control is to prevent defects from happening by whatever means are most suitable. Constructive, long, range plan-

ning must therefore be the keynote of the quality control program.

The prevention of defects can not be effected by quality control alone. In fact, most of the work must be done by others, who must and will always receive full credit for all such accomplishments. The prime tools of quality control are to co-ordinate, plan, and follow up so that the necessary work gets done. Wherever statistical and engineering know-how will help to solve a particularly knotty problem, we should employ these tools, but we should not mistake such detailed technical effort for our main function, which remains the prevention of defects by whatever means are most suitable. These include such things as:

(a) Development of relations with foremen and superintendents which will be helpful in securing prompt and thorough investigation and corrective action when test results are out of control.

(b) Development of relations which will be helpful in securing the acceptance of constructive suggestions.

(c) Development of a quality reporting system which suits the needs and personalities of the foremen and superintendent.

(d) Participation in the periodic meetings of the superintendent and his foreman.

(e) Assist the foreman wherever possible to train operators in quality matters. (How to tell good work from bad, how to splice, how to prevent defects, etc.)

(f) Develop departmental charts, tabulations, contests, displays, etc., to stimulate operator interest, and to measure operator quality performance.

(g) Develop the knack of "smelling out" causes of defects. This is an art which can be developed as experience is acquired. It is not acquired automatically, however, but must be sought after by concious effort.

(h) Build up a reputation for honesty, knowledge, thoroughness, and fairness, which reputation will greatly increase the probability of securing corrective action when it is needed, will help to sell constructive suggestions, will promote closer attention to all reports, and will help relations all around.

(i) Employ mathematical, statistical, or porbabability techniques where desirable. Gardner M. Hailes, *Textile Bulletin 78*, page 141, (September, 1952).

OUTSTANDING AND DEFICIENT PROPERTIES OF SOME COMMON TEXTILE FIBER MATERIALS

Outstanding Properties

Cotton: Inexpensive, good wet and dry strength, simple launderability, high absorbency, good heat and ironing resistance, easy dyeing.

Wool: High elongation, high elastic recovery, warmth, felting power, high moisture absorbency.

Silk: High strength, high pleasant luster, high elasticity, good moisture absorbency, pleasant hand.

Viscose Rayon: Inexpensive, high flexibility, good draping qualities, high moisture absorption and production with controlled size, luster, crimp, strength, etc.

Acetate Rayon: Good draping qualities, pleasant hand, pleasant luster, quick drying.

Nylon: High abrasion resistance, high tensile strength, quick drying, easily dyed.

Orlon: Outstanding weathering resistance, good tensile strength, quick drying.

Dacron: Low flexibility, high elastic recovery, low moisture absorption, good wrinkle resistance.

Dynel: Doesn't burn, resistance to acids and alkalis, wrinkle resistance, compressional resilience and soft warm hand.

Fiberglas: Doesn't burn, extremely strong, good electrical resistance.

Vicara: High moisture absorption, high elastic recovery, easily dyed, good hand.

Deficient Properties

Cotton: Draping, wrinkling, soiling, variation from crop to crop.

Wool: Attacked by moths, shrinks when wet, widely fluctuating price.

Silk: Uncertain supply and price.

Viscose Rayon: Weak when wet, low laundry life, musses easily.

Acetate Rayon: Sensitive to heat, low strength, doesn't launder well.

Nylon: Low elastic recovery, yellows on heating, produces static charge, pills in spun goods.

Orlon: Hard to dye, unavailable in bleached form, produces static charges in processing and wearing.

Dacron: Hard to dye, produces static charges.

Dynel: Unusually low ironing temperature required, produces static charges, unavailable in bleached form.

Fiberglas: Difficult to dye.

Vicara: Weak when wet, does not spin 100 per cent.

W. F. Luther, *Rayon & Synthetic Textiles 33*, page 540 (February, 1952).